PROJECT CONTROLS SUBGROUP

High Total Float

WHITE PAPER

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Objective

The objective of this white paper is twofold. The main objective is to evaluate Department of Energy (DOE) existing measurement and definition of High Total Float (HTF). This includes drawing from other industry guides for comparison. The second objective is to provide best practices and guides to analyzing, managing, and mitigating HTF including proper documentation and justifications of HTF.

Overview

Effective project management is critical to the successful execution of complex initiatives undertaken by the DOE, particularly within its sites and national laboratories. A key element of this discipline is the accurate measurement and management of HTF within the project Integrated Master Schedule (IMS). Mismanagement or misinterpretation of HTF can obscure project risks, undermine resource optimization, and create inefficiencies, potentially compromising achieving mission-critical objectives.

The effective management of HTF requires a structured approach that ensures clarity and alignment among stakeholders. HTF should be documented, with its origins and implications clearly communicated to project teams, contractors, and leadership. This includes integrating HTF metrics into periodic progress reviews, justification for HTF on the activity and aligning HTF thresholds with risk management frameworks to prioritize mitigation when HTF exceeds acceptable limits.

The best way to manage HTF involves establishing clear criteria for identifying "excessive" total float, which may vary depending on project type, complexity, and criticality. Proactive communication, supported by detailed schedule narratives and consistent reporting formats, ensures that HTF insights are accessible to decision-makers. HTF mitigation should be triggered when its presence signals potential risks, such as misaligned resource allocation, unrealistic schedule dependencies, or changes in project priorities. By embedding HTF management within a broader culture of schedule integrity and risk awareness, DOE sites can enhance their capacity to deliver projects on time and within budget while maintaining flexibility to address unforeseen challenges.

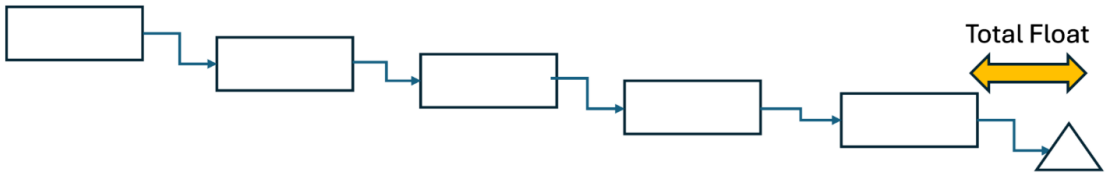
DOE process for measurement and management of HTF is documented in the Compliance Review Standard Operating Procedure (ECRSOP), Compliance Assessment Governance (CAG), refer to Appendices A and B of the white paper. This white paper evaluates the DOE's current definitions and methodologies for measuring HTF and examines how its various sites and laboratories manage and document HTF in practice. The goal is to provide a comprehensive assessment of existing frameworks and identify opportunities for enhancing consistency, transparency, and effectiveness in HTF management across the DOE enterprise. By drawing from case studies, stakeholder inputs, and comparative analyses, this effort seeks to foster a shared understanding of HTF and promote best practices tailored to the unique demands of DOE projects.

Additionally, this white paper includes proposed changes to how the HTF metric is currently calculated and its required frequency to promote greater efficiency and usefulness for project teams.

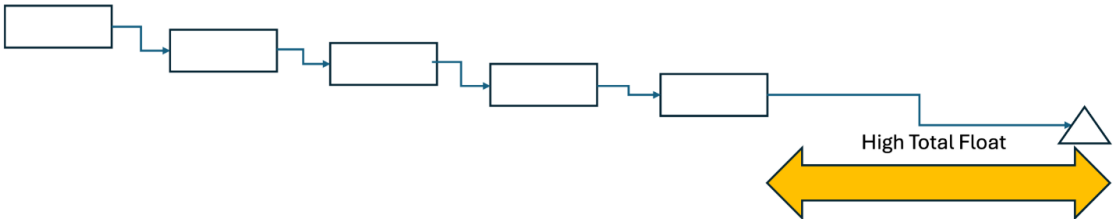
Section I: HTF Metric Evaluation and Recommendation

What is High Total Float?

Total float is the number of days an activity can slip without delaying the discrete project finish. Total float is measured in workdays and is the difference between the earliest an activity could start versus the latest it must start. The calculation considers network logic (activity predecessors and successors, relationship types, and lags), calendars, and constraints.



HTF refers to activities where the number of days before delaying the discrete project finish seems unreasonably high. HTF is based on a calculated threshold outlined in the DOE EVMS Metrics. HTF could indicate incomplete or incorrect logic, durations, forecast dates, time phasing, prioritizing, and resourcing of the remaining project work, all of which will hinder the integrity of the IMS and its capability to provide the project team with the data necessary to make timely decisions. Thus, HTF requires careful analysis and justifications to communicate why the HTF is acceptable if analysis proves the value to be realistic.



Current HTF Metric

The standard metric calculation to determine the HTF threshold is as follows:

> X = Number of incomplete discrete activities in the IMS, where total float >= 10% of the number of workdays from the Contractor Project Performance (CPP) status date to the planned completion date AND total float is not justified (language from DOE EVMS Metric Specification, B.07.11 (Baseline) and B.07.12 (Forecast))
>
> Y = Number of incomplete discrete activities in the Baseline IMS.
>
> HTF = X / Y

The following items in the IMS with a HTF value greater than the calculated threshold will count against the HTF metric for the reporting month:

- Tasks and activities
- Milestones
- Non resource loaded tasks/activities such as Schedule Visibility Tasks (SVTs) and Zero-Budget Activities (ZBAs)

The following items are exempt from the metric and should not be counted towards the metric:

- LOE activities and LOE milestones
- Apportioned effort

Per the current metric, up to 10% of the remaining scheduled activities can trip the calculated threshold without flagging the metric. If more than 10% of the remaining work has total float above the calculated threshold, the schedule is then considered to have "excessive total float" or, HTF. All items tripping the HTF metric threshold for that reporting period above the 10% allowed threshold require review and adequate justification to be considered acceptable and compliant.

Proposed Changes to HTF Metric

As a project approaches the end of its life cycle, the standard calculation will drive the HTF threshold to low numbers and may result in a level of HTF mitigation and evaluation that is no longer value added to the project. For example, if there are 200 days left on a project, 10% of remaining duration will be 20 days requiring any items with a HTF value of 20 days be validated and justified to pass the metric.

This can be mitigated by adding a condition to the metric definition which halts the need to evaluate, mitigate, and justify items with a HTF value less than 44 days (roughly two fiscal months).

Proposed metric calculation: 10% of remaining duration of project OR 44 days, whichever is greater.

Current Frequency for Evaluating HTF

The current frequency for calculation, evaluation, and justification of HTF on the Baseline and Forecast IMS files is monthly. Depending on the size of projects across the DOE industry adhering to 413.3B requirements, this frequently results in a significant monthly effort for projects to evaluate HTF on both IMS files which may not be as valuable to the project manager and project team. It is proposed that the frequency be adjusted to allow for a more value-added and actionable assessment.

Proposed Frequency for Evaluating HTF

Baseline IMS Frequency

The baseline cannot be changed without adequate change control documentation and approval. Once set it is the basis by which the project's performance is measured. Any changes to the baseline via the change control process require implementation in the Forecast IMS and, therefore, the two files should reflect the same changes at the time of approval. The same is true at the setting of the initial Baseline following Critical Decisions 2 or 3 (CD-2 or CD-3). Rather than require HTF analysis on both the Baseline and the Forecast IMS files, it is recommended that the Baseline HTF metric be removed and all HTF management and analysis be conducted only on the Forecast IMS.

If the Baseline HTF Metric is not removed, it is proposed that at minimum the metric's frequency be limited to specific events in a project's life cycle, or quarterly. Since it is discouraged to make significant monthly updates to the Baseline IMS, projects should run and justify the HTF metric, including documenting adequate and compliant justifications at the following specific events:

- Initial completion and finalization of PMB
- Any re-plan or reprogramming effort (i.e. OTB/OTS requiring single point adjustments)
- Major Rolling wave events (i.e. bulk PP conversions to WP)

Each of these occurrences must include a rerun of the HTF metric using the reporting period status date to calculate the HTF threshold. If status is not incorporated into the Baseline IMS file monthly, activities that trip the metric threshold must be checked against the Forecast IMS and completed items removed from the metric calculation.

When HTF is evaluated on the Baseline IMS, all Justifications previously documented must be reviewed for accuracy and any new items now within the metric threshold parameters assessed and either mitigated or justified.

Limiting the frequency the HTF is evaluated on the Baseline IMS allows projects to put dedicated focus on the analysis and justification on the Forecast IMS HTF metric which is more likely to influence and demand timely project decisions.

Forecast IMS Frequency

The HTF metric must be calculated and analyzed on the Forecast IMS monthly following the incorporation of status inputs. Project teams should evaluate, assess, mitigate, and then justify all items that trip the monthly HTF threshold. Items that have justifications documented already must be evaluated monthly to validate that it is still applicable and accurate.

Section II: Managing and Mitigating HTF

If HTF activities are left unexamined, they can potentially mask schedule risks, disconnect activities from meaningful deadlines, and undermine confidence in the project's ability to meet both internal and external objectives. It is essential to establish a structured process to managing HTF, which will facilitate meaningful and effective HTF analysis and mitigation.

Defining Internal (project-defined) and External (customer-defined) Key Milestones

The IMS network establishes a logical sequence of work that leads through key milestones, events, or decision points to the completion of project objectives. To effectively manage HTF, it is essential to establish clear, measurable, and achievable key milestones. These milestones serve as benchmarks for tracking project performance, identifying potential delays, and ensuring alignment with both internal objectives and external requirements.

- **Internal (project-defined) Key Milestones**
  Internal milestones are critical project deliverables or decision points set within the organization to monitor progress and enable proactive management of activities.

  These milestones often include:

  - Approval of baseline schedules and budgets.
  - Completion of internal reviews (e.g., design, procurement, or construction reviews).
  - Achievement of interim project phases or deliverables (e.g., site preparation, preliminary designs, or equipment readiness).
  - Status updates or management review meetings.

- **External (customer-Defined) Key Milestones**
  External milestones are project deliverables that align with commitments made to external stakeholders, regulatory agencies, or funding bodies. These milestones are critical for compliance, funding disbursement, or regulatory approvals and often serve as formal contractual obligations.

  Examples include:

  - DOE reviews and approvals.
  - Construction completion deadlines tied to grant agreements.
  - Regulatory agency inspections or audits.
  - Delivery or commissioning of critical systems or components.

How Constrained Milestones Enhance Total Float Analysis in the IMS

In an unconstrained schedule, total float is typically calculated in relation to the project's final activity or finish milestone. This often results in total float values that reflect the distance to the end of the project, rather than to the intermediate milestones that drive meaningful program execution. As a result, HTF may accumulate on activities that feed into important interim objectives—masking schedule risks and making it difficult to assess true criticality.

Applying constraints (such as "Finish On or Before" or deadline dates) to internal and external milestones allows the schedule to model key delivery or decision points more realistically. When a constraint is applied to a milestone, the scheduling engine recalculates total float based on the earliest path to that milestone, rather than to the project end. This shifts the total float calculation from being project-centric to milestone-centric.

Why This Matters:

1. Clarifies Schedule Drivers: Constrained milestones identify alternate driving paths that may not terminate at the project finish. These include paths leading to key deliverables, regulatory deadlines, or funding gates—elements that often carry contractual or operational significance.
2. Improves Risk Visibility: Activities feeding into constrained milestones will show reduced total float (or negative total float if the constraint is violated), highlighting emerging risks much earlier than if only the end-of-project total float is considered.
3. Enables Better Prioritization: Milestone-based total float analysis helps identify which work packages or control accounts are most at risk of delaying mission-critical events, supporting more focused resource allocation and mitigation planning.
4. Supports DOE Compliance Assessment Guide (CAG) and Other Best Practices: DOE and CAG-compliant scheduling practices emphasize the need for logic-driven, fully integrated schedules. Constraining milestones ensures that the IMS reflects the real sequencing and timing of work, improving transparency and supporting audit-readiness.

Constraints in the IMS require adequate justification to be considered compliant per the CAG and the Integrated Program Management Report (IPMR) Data Item Description (DID) and should only be used for legitimate reasons (such as delivery dates outlined in contract and/or Project Execution Plan (PEP), etc.). They should never be used to artificially reduce total float values. By strategically applying constraints to selected milestones, the IMS becomes a more dynamic tool for managing performance, identifying schedule risks, and aligning with both internal execution strategies and external customer commitments. Application of hard constraints as endorsed in this section will potentially lead to red trips on other metrics (B.03.11 and B.03.12, IMS with Hard Constraints), and therefore, they should only be used scarcely and with strong logical justifications.

Efficient Management of HTF

HTF management can be complex and, depending on the project, may demand abundant time and resources if the number of items requiring analysis, correction, and or justification is significant. Ultimately, the review of HTF should be a useful process that informs the project team so that timely decisions can be made, and the integrity of the IMS can be maintained. It is encouraged that projects consider ways to minimize the impact of HTF analysis and documentation by implementing efficiencies. The following section documents some lessons learned and best practices that have been utilized by DOE sites and projects to achieve a sustainable, useful, and effective process for HTF analysis.

Targeted Focus/Management by Exception

Depending on complexity and the number of tasks tripping the HTF threshold, some projects may prioritize a subset of tasks that meet a specific criterion they have outlined in their HTF process or identified as potential risk items. This subset will automatically be assessed using a specific method to determine if the total float value is legitimate or if a correction is required. For example, a project may state that a Pull Test be performed on the 10 paths showing the highest HTF values. This targeted focus on the highest total float values has a high potential for identifying a correction that could eliminate the issue or provide insight into other areas of the schedule tripping the HTF threshold.

Justification Sampling

On projects spanning several years, it may be advisable to set a near term window/sampling plan for what HTF items will require justification to reduce the need to document justifications for thousands of tasks monthly. For example, a five-year project may set an 18-month sample window that requires justifications. Schedule Logic analysis must still be performed on the entire schedule to validate the HTF is correct and no downstream schedule issues exist, but documented justifications would only be required for items starting or finishing within the set 18-month sample window.

The project must defend and document their Justification Sampling window in their Project Control Plan. During the project's monthly evaluation process, existing justifications would still need to be reviewed and new items within the window adequately justified. The Justification Sampling window must move with the project status date and can only be applied to the Forecast IMS. Additionally, justification sampling windows must not be less than six months. Anything less than six months will not allow adequate time to address any issues impacting the predictive capability of the IMS in the near term.

Standardization

Some projects may find it beneficial to issue standardized HTF justification options for CAMs. Standardized justifications should adhere to the criteria outlined in this white paper and must be reviewed regularly by the project for validity and applicability.

Once the HTF review and management process has been determined, projects should document the process and all standard justifications, review cycles, frequency, and criteria in the Project Control Plan.

Combining IMS Files for HTF Analysis

The current DOE HTF metrics require examination for both the baseline and forecast schedule with separate metrics designed to evaluate the quality of both the baseline plan and the current execution schedule. For efficiency of analysis, opening both the baseline and forecast together in a single schedule enables an easier evaluation of the current HTF metrics and how changes have impacted HTF compared to the baseline.

In the scheduling tools, the baseline can be assigned to the forecast IMS and will appear as a single schedule that will also contain the baseline attributes. Running the HTF metrics on this singular schedule would be beneficial as it will cut down on the resources needed to analyze the total float as well as identify where the total float issues are located (as they appear with status on the forecast schedule). The current frequency for calculation, evaluation, and justification of HTF is run monthly on both the Baseline and Forecast IMS files. This can still be a monthly analysis, but utilizing the single file will cut the analysis down by 50%.

This method could be utilized as an efficiency in the event both BL and FC IMS HTF metrics remain in effect. If Baseline IMS limited frequency is accepted, this method could be used during the events requiring Baseline HTF metric analysis.

Section III: Validating and Analyzing HTF

Total float is affected by factors such as the task's position relative to the critical path, the scheduling logic, resource availability, and risk management strategies. Therefore, while there can be a connection, the presence of HTF requires a comprehensive analysis of the specific scheduling circumstances. Having multiple relationships can contribute to HTF—especially if any of the logic ties are to tasks that are not on the critical path.

Once the HTF threshold is determined, all applicable items tripping the threshold need to be reviewed and the schedule logic assessed to determine what is driving the HTF condition. If not analyzed or assessed for accuracy, HTF can mask potential issues and impair the predictive capability of the IMS. The objective is to determine if the HTF value is accurate and acceptable. If it is accurate and acceptable, an adequate and compliant justification for the HTF value will need to be documented (see Section IV). If it is not, appropriate action must be taken to correct the issue found.

Multiple scheduling elements impact Total Float in the schedule and should be considered when validating the HTF for accuracy. Additionally, several existing Schedule Health metrics and indicators can also be utilized to analyze the HTF. The following section reviews some of these schedule elements and health indicators.

Schedule Logic Health Metrics

Logical relationships between tasks should reflect true relationship of the planned tasks in the IMS and should never be artificially linked to reduce total float values. Doing so will adversely affect the predictive capability of the IMS and could create false driving and critical paths.

Multiple schedule health checks can be utilized to help pinpoint potential logic relationships that may cause excessive total float in the schedule. All these metrics should be reviewed in conjunction with HTF:

Missing Logic

Missing successors or predecessors will distort HTF and mask potential schedule conflicts if not corrected. Running the health metric associated with missing logic in the schedule and comparing any activities or tasks that trip that metric against the activities or tasks tripping the HTF threshold will help pinpoint areas in the schedule that require correction.

Dangling Logic

Dangling Logic, also known as open start or open finish logic, occurs when there is only a Finish-to-Finish (FF) predecessor or only a Start-to-Start (SS) successor to a task. In other words, dangling logic exists when there is a logical relationship in which the start of the task is not dependent on predecessor logic, only the finish is driven by the predecessor (or with an open finish, no successor task is dependent on the finish of the task).

Dangling logic in the IMS can create artificial HTF as delays (push) in in-progress tasks may impact downstream tasks. Although only a SS successor is an acceptable relationship, it is not sufficient and creates an open-ended logic. A Start-to-Start (SS) successor relationship with no Finish-to-Start (FS) or Finish-to-Finish (FF) relationships can create artificial high float values and should be reviewed for accuracy, and an appropriate FS or FF relationship is applied. This ensures the logic is complete, total float values are correct, and schedule risk transforms to downstream tasks. Tasks with only FF predecessor is another type of dangling logic with an open start and therefore is not sufficient. Tasks with open start predecessors should also have a FS or SS relationship. Many software tools can identify dangling logic. In addition, these activities can be identified with the push/pull tests.

Merge Points

HTF in a project schedule can be influenced by the number of successors a task has, but it may not be a direct correlation. Tasks with one merge point successor task, might exhibit more total float values due to complex interdependencies and scheduling flexibility.

Tasks or milestones with greater than 15 predecessors or successors are considered merge points in the schedule. It is required that tasks that trip the merge point metric be reviewed for accuracy. These items are considered high risk in the schedule and

sometimes can drive HTF in the schedule by creating an excess of "free float" in some of its predecessors and successors. Merge points require a significant number of items to complete before they can proceed. If one schedule task (path) to a merge point is driving the start of that merge point task and pushes it out to the right, all other predecessor tasks (paths) linked to the same merge point task may show increased total float values. Having the Merge Point check results available while assessing HTF items can quickly provide information necessary to either question the logical relationships to the merge point or the information needed to adequately justify the HTF condition.

Evaluating and Assessing HTF

Numerous methods exist that can assist in determining the validity of HTF in the IMS. The following section discusses the recommended methods and additional schedule related metrics that can assist in the evaluation of HTF. It is worth mentioning that conducting the analysis provides the project team with more than just the information necessary to justify or correct items in the schedule for HTF. The IMS serves as a predictive model for the project team and provides the information necessary for the project manager to make timely decisions, however it is only useful if the schedule network put in place is accurate and complete. Testing that network to evaluate the validity of HTF items in the schedule and addressing results leads to a more robust and accurate IMS.

Schedule Path Analysis Techniques

To accurately evaluate and assess HTF in the schedule, the logical relationships of the tasks tripping the metric threshold need to be reviewed and validated. Working with the Project Planner, the CAM should trace all tasks within their purview tripping the HTF metric threshold forward through the schedule network. Tracing forward will isolate the path through the network and will allow the CAM to determine if the relationships it is driving in the schedule are appropriate. Any of the following methods can be used to isolate the schedule path of a certain task in the schedule (See Appendix D for detailed process steps:

Push Test

The Push Test isolates the schedule path a task is on by adding significant duration to the chosen task to drive it artificially to the Longest Path with a significant amount of negative total float.

To utilize this for HTF analysis, select a task that is tripping the HTF metric threshold. Ensure that the project end date is constrained. The amount of duration added to the selected task must exceed the current total float values by several hundred days to be effective. It is recommended that snapshots be taken of the original duration and status details screens in P6 for the selected task BEFORE applying the high duration. When additional duration is applied, schedule the task. A large amount of negative total float should now be reflected, and the task should be on the Longest Path for the project. Filter for Longest Path. The path is now isolated, and the logic can now be reviewed for accuracy and mitigation.

If there is no impact to the project end date or the impact is not what is expected, this is an indication that the logic is incomplete and needs correction.

Pull Test

The Pull Test challenges the existing network relationships by constraining the Project End or any interim milestone/deliverable back to the status date. This drives a significant amount of negative total float throughout the entire schedule network which in turn allows for the isolation and identification of potential logic issues.

In relation to analyzing HTF, running the Pull Test by constraining the Project End date to the current period end date and filtering for any non-LOE activities with total float values over 0. Any discrete activities not impacted by the Pull Test are not linked into the schedule network appropriately and need to be addressed. Any activities identified by this Pull Test are very likely to be also activities tripping the HTF threshold.

The Pull Test can also be used to test the logic into a specific merge point or interim milestone by constraining that task or milestone to finish on the current period end date. All items impacted and showing negative total float values are linked into that merge point or interim milestone. All items not impacted will still show positive total float and can be filtered out to allow for isolated analysis.

Analyzing Schedule Path Analysis Outcomes

Once the schedule path is isolated, the following questions should be asked and answered to determine validity of the HTF:

Questions to ask while performing schedule path analysis on HTF items:

- Can the task really slip X number of days without impacting the project (X= total float value)?
- Is the logic applied to this task in the schedule correct? Is there a more logical successor or predecessor not showing on the primary schedule path creating the HTF value?
- Are there constraints impacting the total float of this task? Are the constraints appropriate? Are any missing?

Depending on the answers to these questions, there will be either an action to correct any logic errors found or data collected to draft an adequate justification for the HTF condition.

Schedule traces through the IMS will inevitably require communication between CAMs and IPTs to validate the logic is correct. This fosters a collaborative project team strengthening the continued accuracy of the schedule network and the IMS's predictive capability and usefulness to inform project decisions.

Other Project Considerations

Depending on the business rhythm of the project, it is possible that actions identified may not be executed in the current reporting period. In these cases, the actions necessary must be documented in the current reporting period and addressed in the following reporting period. Expeditious correction of issues found will minimize impact to the predictive capability of the IMS. If these issues are found while reviewing the Baseline IMS HTF metric, the necessary change control procedures must be followed to make the corrections and documented actions related to that process must consider and reflect the timing necessary to achieve it.

Section IV: Justification and Documentation

After all analysis has been conducted and logic has been verified, all activities and milestones still tripping the metric threshold require adequate justification. As stated before, any LOE and Apportioned Effort related milestones, activities, and tasks do not require justification and should not be counted towards the metric. To avoid confusion, it is strongly recommended that all items that are LOE or Apportioned be flagged as such in some way in the IMS using a custom flag field or by including an indicator in the activity name.

Justification Criteria

To be considered adequate and compliant, HTF Justifications need to meet the following criteria:

- **Criteria 1:** HTF Justification must indicate that the schedule logic has been reviewed and is correct and that there are no missing links or constraints driving a false HTF value. This can be tested by asking the following question when reviewing the justification. Does it demonstrate an understanding of the schedule network, what the task is driving, and that the applied logic is correct? Avoid making blanket statements like “logic has been reviewed and is correct” and instead provide the proof by stating specific knowledge of the network. For example, “this task is linked to (insert task name or specific end item deliverable) and is planned to complete earlier than need date.”

- **Criteria 2:** HTF Justification must speak to the reason why the total float is above the threshold and why it is acceptable from a project perspective. Using the example from Justification Criteria 1, in addition to stating that the task is planned to complete ahead of the need date, address why the activity is planned so far in advance. Was there a project directed reason that resulted in the task being planned so far in advance? For example, is it a material item ordered ahead of the need date to mitigate specific risk? Is there a documented risk or opportunity that the activity supports? If yes, give specifics and be prepared to produce those documents in an audit.

- **Criteria 3:** HTF Justifications must be comprehensive enough to explain validity of the HTF value in a way that someone outside the project and/or unfamiliar with the technical scope can understand it. Remember, this data is reviewed not only by

fellow project members, but also outside auditors, customers, and stakeholders who are not as well versed in the project's nuances.

- **Criteria 4:** Adequate HTF Justification infers that a regular, consistent, and effective process is in place on the project to review, understand, mitigate, and justify HTF items in the IMS. This does not need to be explicitly stated in the justification but be aware of data points included in the justification, for example dates, that if not updated may give the impression the justification is not being reviewed monthly and addressed accordingly. Past due dates or logic references that are inaccurate signal that the CAM has not reviewed the justification monthly and calls into question the consistency and effectiveness of the process in place.

- **Appropriate justifications Examples:**
  - This task is linked to (Delivery/Interim Milestone/Activity) and is forecast to complete far earlier than it is needed. This task was planned early to mitigate risks associated with potential delays in procurement. Please see Risk ID (insert number) in Risk Register for further details.
  - As a result of its technology maturation process, the project has built prototypes for several components in collaboration with approved vendors. To ensure that this considerable knowledge base is available for full-scale production activities, the project has planned procurements as early as possible within its funding constraints.
  - HTF triggers on this activity are due to the timing of the availability and use of the Basic Hand Tools ahead of the other discrete work for the finalization of Dirty Work Completion.

Other Considerations

Justifications documenting required corrective action

Depending on the project business rhythm and monthly deliverable requirements, there is a possibility that items found while evaluating HTF cannot be corrected within the month they are reviewed. If this occurs, justification must still be documented on all the items tripping the threshold for the reporting period. Justifications for these items should speak to the issue discovered and the action necessary to rectify it. Such issues should not occur beyond one reporting period for the forecast IMS. If this occurs on the Baseline IMS, items in this condition must be addressed in accordance with the established baseline change control procedures and timelines. Once resolved, the justification can be removed. Maintaining justifications that require actions for correction in the IMS are an indicator of a consistent process if they are addressed in a timely manner.

Justification applicability

If schedule logic analysis is conducted, the justification for tasks on a specific path in the schedule can have the same justification applied.

Documentation options

HTF justifications can be documented directly in the IMS using the JSON assigned justification field in P6 or they can be documented via a separate document. Given the character constraints in the P6 JSON Justification Field, a separate document is often advisable, however, the JSON field in P6 still needs to be populated and should identify the HTF Justification document.

If using an HTF Justification document, it must include at minimum the following information:

- Activity ID
- Activity Name
- Total Float Value
- Justification
- Documented cases or project approved justifications (if applicable)

Including this information will allow the project manager, other project team members, auditors and outside entities to review and easily trace the justifications back to the activities tripping the threshold in the IMS. The document should be configuration controlled and delivered with any IMS submittal required by the customer if applicable. The document must also be delivered in any data call provided for surveillance audits, independent reviews, monthly passive surveillance, etc.

Conclusion

Effective management of HTF is essential for maintaining schedule integrity, optimizing resources, and ensuring the successful execution of DOE projects.

This white paper has explored the current methodologies for measuring and managing HTF across DOE sites and laboratories, highlighted key challenges and recommended opportunities for improvement.

The white paper specifically outlines proposed changes to the HTF metric calculation and frequency, utilizing methods and schedule health indicators to analyze HTF, identify necessary corrections, and supply adequate justifications. By implementing the recommendations and practices outlined in this white paper, project teams can achieve greater consistency in HTF interpretation, improved schedule reliability, and strengthen their ability to meet critical mission objectives. As DOE continues to refine its project management strategies, fostering a shared understanding of HTF and its implications will be key to sustaining long-term efficiency and success.

Attachments

Appendix A – High Total Float (HTF) Across Government & Industry Guidance.
Appendix B – Merge Points or Merge Bias Across Government & Industry Guidance
Appendix C - Primavera P6 vs Microsoft Project Methods and Calculations
Appendix D – Push / Pull Tests Process Steps

Appendix A – High Total Float (HTF) Across Government & Industry Guidance

Office of Project Management (PM) **Earned Value Management System (EVMS)** **Compliance Review Standard Operating Procedure (ECRSOP)** **Appendix A - Compliance Assessment Governance (CAG) 2.0**	
From The Document (Direct Text)	While total float of an activity more than the threshold can on occasion be acceptable and signify those activities that do not have to be completed within 10% of remaining duration before they impact an event or milestone or the completion date of the project, it is assessed from the standpoint of optimizing the allocation of resources. Specifically, the planning and scheduling process identifies the availability of resources to execute workflow, generating resource plans that are iteratively developed until aligned with budget levels and resource constraints. Given the complexity of projects/programs, including constraints on job sites due to additional security and nuclear safety measures and the availability of special skills/materials, activities having excessive float and the reasons thereof are not overlooked. Instead, these are judiciously planned and transparently communicated. Note that excessive float is commonly utilized as a risk mitigation strategy. However, using excessive float in this manner without regard to the integration with all other facets of project management, specifically a project's risk management process, can lead to avoidable planning, scheduling, and budgeting issues caused when there is a divergence in the planned progression. During planning and scheduling, and routine surveillance, a methodology such as below is instrumental to assess, resolve, and manage activities with high total float. 1. Identify, document, and report activities with total float more than the threshold of 10% of a project's remaining duration. 2. Activities with total float more than the threshold are to be analyzed via a "schedule walkdown" (schedule review) by the PM, CAM(s), PCE(s), risk manager(s), and technical SME(s) to mitigate silo planning and merge bias and ensure appropriate workflow and corrections to logic links and durations are made as needed via established change control procedures. Results are documented. Key things to assess include: a. workflow relationships, b. resource constraints, c. preferential logic, and

Office of Project Management (PM) **Earned Value Management System (EVMS)** **Compliance Review Standard Operating Procedure (ECRSOP)** **Appendix A - Compliance Assessment Governance (CAG) 2.0**	
	d. activity durations. Schedule walk-downs (reviews) also engage and consider the risk management process. If the excessive float activities are identified as risk mitigation actions, then review their integration with the project's risk register. These activities are thoroughly evaluated, including an assessment of the risk trigger dates. Additionally, a population of similar types of excessive float activities such as procurements can manifest as a workflow bow-wave and introduce additional risks such as those associated with material management system discrepancies as well as quality and physical degradation due to inappropriate storage. Justification for activities that have total float greater than the threshold are documented and routinely reviewed in future schedule walk-downs to determine if adjustments can be made to workflow, logic links, and/or durations, or ensure that the documented justification remains valid. The primary goal of planning and scheduling is not to build schedules to meet metric thresholds, but to ensure logic, durations, and overall workflow of the project is accurate. This active and ongoing management process to understand and manage the risks associated with high total float are documented and assessed as part of a contractor's self-governance program. Alternate metrics and controls may be applicable to verify the process is still in control and risk is managed. An alternate method for work that can be done in any sequence might be used to demonstrate the activities with total float more than the threshold are being managed and not overlooked.
Course Of Action (AI-Assisted)	1. Identify high total float activities (exceeding 10% of project's remaining duration), document, and report them. 2. Conduct collaborative schedule reviews (PM, CAMs, PCEs, Risk Managers, SMEs) to validate workflow logic, resource constraints, preferential logic, and durations. 3. Align with risk management by confirming high total float tasks used for mitigation align with the risk register and trigger dates. 4. Justify and track all high total float activities, documenting reasons and periodically revisiting them in subsequent walkdowns. 5. Maintain accuracy and transparency, focusing on valid logic, realistic durations, and integrated risk management—rather than simply meeting float thresholds.

U.S. Department of Energy (DOE) 413.3-24 Planning and Scheduling	
From The Document (Direct Text)	Challenge activities with negative or high total float. Total float is the amount of time that a schedule activity can be delayed from its early start date without delaying the project finish date or impacting a schedule constraint. Negative total float implies an infeasibility in the schedule. An excessive amount of float may challenge the validity of the schedule. Where total float is considered high the resource profile curve can be affected possibly skewing resource-leveling scenario analyses. Review such high total float changes monthly for reasonableness and adequate justification. Conversely, investigate any negative total float which may indicate a performance issue requiring workarounds or additional management priority. [GAO BP #7]. Risk: Maintain the Risk Register. Complete an SRA [GAO BP #8] prior to a long lead procurement, executing a construction contract, annually calculating a comprehensive estimate at complete (EAC), and changing the PB. Assess the likelihood of achieving the established CD-4 date based on an SRA calculated without SM or DOE schedule contingency using a confidence level between 70 and 90 percent. Find more detailed guidance on SRAs in both GAO-16-89G and PASEG. Status: Maintain the forecast schedule with actual start and finish dates, percent complete, and forecasted remaining durations. Ensure supplemental or detailed schedules developed by contractors remain consistent with the forecast schedule. Status the schedule and recalculate the critical path at least monthly. Review new activities for logic and completeness. For earned value, ensure that CAMs status activities consistent with the identified EVTs. Do not calculate earned value (EV) for discrete work based on the passage of time. • Review free and total float, which communicate schedule priorities, changes, and impacts, for significant changes. Use free float to de-conflict resources or activities as its use does not impact successor activities [GAO BP#9]. • Performing activities out of sequence, or changing logic, may increase total float. Prior to executing, have the integrated project team review and validate these changes while verifying that all activities have proper predecessor and successor relationships. • If problems arise, incorporate workarounds in the forecast schedule as soon as possible. Ensure the CAMs, with assistance from project

U.S. Department of Energy (DOE) 413.3-24 Planning and Scheduling	
	controls, update the schedule in P6. Assign the schedule a unique identification number and archive it monthly [GAO BP #9]. • Calculate the IMS via the retained logic option in P6 and not the progress override. Reconcile or correct circular errors monthly [GAO BP #9]. Hold IMS management reviews monthly. Document significant variations and workarounds. [GAO BP #9] • Keep the baseline schedule, including original durations, relationships, resources, and EVTs, under configuration control and use it for earned value calculations. Maintain the baseline to demonstrate an executable plan and sequence for future activities [GAO BP #10].
Course Of Action (AI-Assisted)	1. Review high total float monthly for resource impacts and justification. 2. Keep the risk register updated and conduct schedule risk analyses (SRAs) at key junctures with a 70–90% confidence level. 3. Review new activities for logic and completeness. 4. Validate out-of-sequence work or modified logic with the integrated project team and promptly incorporate workarounds. 5. Document significant changes in total float.

NDIA Planning & Scheduling Excellence Guide (PASEG)	
From The Document (Direct Text)	Rationale: High total float may represent either a favorable or unfavorable condition. It is favorable when the sequence of tasks is accurately forecasted to complete significantly ahead of project completion and any downstream constrained targets/deadlines. It is unfavorable when the high total float is a result of poor schedule construction/maintenance practices such as inaccurate or missing predecessors and/or successors and thus suppressing the true urgency of the effort. Remarks: The threshold used for “high” may not be the same on all projects, but should represent a value (or percentage of remaining project length) large enough so that it would focus attention on tasks that are showing to be significantly early to need (seemingly "too good to be true").
Course Of Action (AI-Assisted)	1. Define the number of percentage of tasks that constitute high total float based on the overall length of the project. 2. Review and validate the network logic.

EVMSIG	
From The Document (Direct Text)	*Contains no information on High Total Float.

EVMIG	
From The Document (Direct Text)	* Contains no information on High Total Float.

GAO Schedule Assessment Guide	
From The Document (Direct Text)	The amount of time an activity can slip before the program's end date is affected is known as "total float." The difference between an activity's early and late dates is known as total float or slack. Total float is an essential output of critical path method scheduling, and its proper management is the foundation of Best Practice 7. **Best Practice 7:** **Ensuring reasonable total float.** The schedule should identify reasonable total float (or slack)—the amount of time a predecessor activity can slip before the delay affects the program's estimated finish date—so that the schedule's flexibility can be determined. The length of delay that can be accommodated without the finish date's slipping depends on the number of date constraints within the schedule and the degree of uncertainty in the duration estimates, among other factors, but the activity's total float provides a reasonable estimate of this value. As a general rule, activities along the critical path have the least total float. Unreasonably high total float on an activity or path indicates that schedule logic might be missing or invalid.

GAO Schedule Assessment Guide	
	The two types of float most commonly monitored are total float and free float. Total float, the amount of time an activity can be delayed or extended before delay affects the program's finish date, can be positive, negative, or zero. If positive, it indicates the amount of time that an activity can be delayed without delaying the program's finish date. Negative total float indicates the time that must be recovered so as not to delay the program's finish date beyond the constrained date. Negative total float arises when an activity's completion date is constrained—that is, when the constraint date is earlier than an activity's calculated late finish. In essence, the constraint states that an activity must finish before the date the activity may finish as calculated by network logic. Negative float can also occur when activities are performed in a sequence that differs from the logic dictated in the network. Out-of-sequence logic is discussed in detail in Best Practice 9. Zero total float means that any amount of activity delay will delay the program's finish date by an equal amount. An activity with negative or zero total float is considered to be critical. Free float is the portion of an activity's total float that is available before the activity's delay affects its immediate successor. Depending on the sequence of events in the network, an activity with total float may or may not have free float. For example, it may be possible that an activity slips 2 days without affecting the finish date (2 days of total float), but this delay will cause a 2-day slip in the start date of its immediate successor activity (zero free float). Total float and free float are therefore indicators of a schedule's flexibility. Some activities in the schedule network can slip without affecting their immediate successors, and some may affect their immediate successors but not the program finish date. Knowing this allows management to reassign resources from activities that can slip to activities that cannot slip. Knowing the length of time an activity can or cannot be delayed is essential to successfully allocating resources and to completing the program on time. Nonworking periods are not float. Nonworking periods are defined in project and resource calendars and dictate the availability of resources to work, not the flexibility of an activity's start or finish dates. In addition, float should not be treated as schedule contingency. Because float is

GAO Schedule Assessment Guide	
	shared along a sequence of activities, it is available for use by any activity along that sequence.
Course Of Action (AI-Assisted)	1. Identify high total float activities. 2. Determine which activities can slip without affecting the project finish date, recognizing these as potential candidates for resource reallocation. 3. Use the flexibility from high total float to support tasks with little or no float, helping ensure critical activities stay on track. 4. Recognize that total float is shared along a sequence of activities—do not use it as a dedicated buffer or schedule contingency. 5. Remember that nonworking time (defined in calendars) is not float; it reflects resource availability rather than schedule flexibility. 6. Maintain precise activity logic so that total float values remain valid indicators of how much a task can slip without jeopardizing project completion.

NASA Scheduling Management Handbook	
From The Document (Direct Text)	There are two types of float (slack) common to most scheduling tools. They are “total float” and “free float.” Total float is defined as the amount of time that a task or milestone can slip before affecting the project end date. Free float is defined as the amount of time a task or milestone may move into the future from its early finish date before affecting its immediate successor task(s). Schedule analysis utilizing both types of float values is common, but each must be used for its appropriate application. It should be noted that accurate float values can only be determined if a complete and validated network logic is in place. While free float is valuable in analyzing scenarios involving schedule impacts and conflicts for a specific set of tasks/milestones and prioritization of resource utilization, it should generally not be used as a means of monitoring and managing schedule performance for the total project. An important key to achieving the desired schedule completion date is being able to identify and evaluate what tasks are directly driving the project end date. Total float provides this capability, and knowing the total float for every task and milestone in the schedule will provide management with the necessary insight into how each task impacts the project end date.

NASA Scheduling Management Handbook	
	Credible schedule management is not possible without proper analysis of float values.
Course Of Action (AI-Assisted)	1. Validate network logic. 2. Track total float to see how each activity or milestone can slip before affecting the overall finish date, ensuring you identify the true drivers of project completion. 3. Evaluate which activities directly drive the end date and require closer management attention. 4. Regularly review and interpret both total float to maintain an accurate and actionable view of schedule health.

Appendix B – Merge Points or Merge Bias Across Government & Industry Guidance

Office of Project Management (PM) Earned Value Management System (EVMS) Compliance Review Standard Operating Procedure (ECRSOP) Appendix A - Compliance Assessment Governance (CAG) 2.0	
From The Document (Direct Text)	2. Activities with total float more than the threshold are to be analyzed via a "schedule walkdown" (schedule review) by the PM, CAM(s), PCE(s), risk manager(s), and technical SME(s) to mitigate silo planning and **merge bias** and ensure appropriate workflow and corrections to logic links and durations are made as needed via established change control procedures.
Course Of Action (AI-Assisted)	Validate schedule logic linking to merge points to understand potential merge bias.

U.S. Department of Energy (DOE) 413.3-24 Planning and Scheduling	
From The Document (Direct Text)	Schedule **merge points** are defined as greater than 15 predecessors. (GAO and PASEG do not specify a minimum/maximum value.)
Course Of Action (AI-Assisted)	Validate merge points where there are more than 25 predecessors.

NDIA Planning & Scheduling Excellence Guide (PASEG)	
From The Document (Direct Text)	**Technical Details** The Schedule Risk Assessment determines program-level schedule risk as a function of risk associated with various activities that compose the program. Probability distributions are developed for each activity using 3-point duration estimates (Maximum, Most Likely, and Minimum) with reference to historical data. The method uses these distributions in a Monte Carlo simulation of the schedule to derive a probability distribution of total program completion or other key dates within the program. It also identifies the activities most likely to delay

NDIA Planning & Scheduling Excellence Guide (PASEG)	
	the program completion so they can be targeted for risk mitigation. The resulting program level schedule is then analyzed to determine the actual schedule risk and to identify the schedule drivers. Schedule Risk Assessment expands the Critical Path Method (CPM) of determining the most likely finish dates by considering the probability and impact of risks and opportunities on the Integrated Master Schedule. The CPM approach uses only a single point (most likely) estimate for the duration of program activities to develop the programs expected duration and schedule. Use of only a deterministic schedule management approach can lead to underestimating the time required to complete the program and schedule overruns. This occurs for three reasons: • The single point estimates do not adequately address the uncertainty inherent in individual activities and in many programs are underestimated • Predicting the future is difficult and humans tend to be optimistic about it • The structure of the schedules implies extra risk at **points where paths merge** At these **merge points** a delay on any of the merging paths will cause the program to be delayed, so its progress is sensitive to delays on all paths. After the SRA is run the Risk software will indicate how often a task is on the critical path for the number of trials. Tasks on the Critical Path a high percentage of the time represent
Course Of Action (AI-Assisted)	1. Identify merge points in your schedule as schedule risk areas, since delays on any merging path at these points will cause overall program delays. 2. Account for schedule sensitivity at merge points by recognizing that progress can be impacted by delays on all paths leading into the merge, not just the critical path. 3. Consider merge points as part of your Schedule Risk Assessment analysis, going beyond single-point CPM estimates to understand their full risk impact.

EVMSIG	
From The Document (Direct Text)	*The word "**merge**" was not mentioned once in the document.

EVMIG	
From The Document (Direct Text)	*The word "**merge**" was not mentioned once in the documentation.

GAO Schedule Assessment Guide	
From The Document (Direct Text)	**Path Convergence** Joining several parallel activities with a single successor activity is known as path convergence. Path convergence can be unrealistic in a plan because it implies the need to accomplish a large number of activities on time before a major event can occur as planned. The convergence of many parallel activities into a single successor—also known as a "**merge point**"—causes problems in managing the schedule. These points should be a key program management concern because risk at the **merge point** is multiplicative. That is, because each predecessor activity has a probability of finishing by a particular date, as the number of predecessor activities increases, the probability that the successor activity will start on time quickly diminishes to zero. Path convergence is the basis of "**merge bias**," which we discuss in detail in Best Practice 8. Because of this risk effect, activities with a great many predecessors should be examined to see if they are needed and if alternative logic can be used to link some predecessors to other activities. Predecessor activities should also be examined for available float. If many of the predecessors leading to the **merge point** have large amounts of float available, then convergence may not be an immediate issue. However, if several predecessor activities are determining the date of the successor event, then the workflow plan should be reexamined for the realism of performing many activities in parallel with the available resources. Predecessors with large amounts of total float that lead to a **merge point** may indicate that activities are not sequenced correctly or optimally. Often paths converge because major milestones are used to "tie off" many predecessor activities, some of which may be only marginally related to the actual milestone.

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	The appropriate number of converging activities varies by project. The reasonable number of parallel activities is not the same in large and small projects. Because most work is performed serially, the majority of the schedule activities should have F–S relationships, in a waterfall approach to the work. An excessive number of parallel relationships can indicate an overly aggressive or unrealistic schedule. **Merge Bias and Schedule Underestimation** One of the most important reasons for performing a schedule risk analysis is that the overall program schedule duration may well be greater than the sum of the path durations for lower-level activities. This is so partly because of schedule uncertainty and schedule structure. A schedule's structure has many points where **parallel paths merge** that can cause the schedule to lengthen. **Merge points** may include key program events such as preliminary design review, the beginning or ending of project phases, or product deliveries. The timing of these **merge points** is determined by the latest **merging path**. Thus, if a required element is delayed, the **merge event** will also be delayed. Because any **merging path** can be risky, any **merging path** can determine the timing of the **merge event**. Figure 36 gives an example of the schedule structure that illustrates the network of a simple schedule with a **merge point** at start-up and test. The added risk at **merge points** is called "**merge bias**." As we discussed in Best Practice 2, risk at **merge points** is a concern because it is multiplicative. For example, suppose that a schedule risk analysis has determined that the two start-up and testing paths in figure 36 each has a 60 percent chance of finishing on time. The start-up paths are not necessarily a concern individually, but the success of the completion milestone is a concern. Its success is the probability of both paths completing on time—36 percent. In fact, given that each path has a 60 percent chance of success, the milestone will finish late in three of four scenarios: if the electrical test runs late but the plumbing test is on time (24 percent chance), if the electrical test is on time but the plumbing test runs late (24 percent chance), or if both the electrical and plumbing tests run late (16 percent chance). The completion milestone is not likely to be on time even though each individual testing path is likely to complete on time. Moreover, the chance of success at a **merge point** decreases the more that paths converge. If a

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	third test were added, say a furnace and air conditioning test, and its success is determined to be 60 percent also, the overall chance of success for the completion milestone would be 22 percent. **Merge bias** is one reason that the finish date of even a well-constructed schedule is likely to be later than scheduled. The **bias** is driven by a combination of risk on individual paths, the amount of free float before the milestone, and the number of **merging paths** at that milestone. Case study 14 provides an example of the potential effects of converging activities on scheduled activities.
Summary (AI-Assisted)	Path convergence happens when several activities **merge** into a single successor activity, creating a "**merge point**." **Merge points** can be problematic because delays in any of the merging activities can delay the successor activity, and the risk of delay increases as more paths converge. This is known as **merge bias**, where the chance of on-time completion at a merge point decreases with the number of merging paths. For example, if two activities each have a 60% chance of finishing on time, the **merge point** (successor) has only a 36% chance of starting on time because both activities must finish on time. Adding more paths further lowers this probability. **Merge bias** is why project timelines often end up being longer than initially expected, even with a well-constructed schedule. To manage this risk, projects should: • Evaluate whether all **merging activities** are necessary. • Look for alternative ways to structure the schedule to reduce convergence. • Check if predecessor activities have excessive float, which might indicate poor sequencing or unnecessary parallel work. Ultimately, **merge points** should be carefully analyzed and managed to ensure the schedule remains realistic and achievable.
Course Of Action (AI-Assisted)	1. Analyze **Merge Points**: Identify where multiple paths converge into a single successor activity. These points are key risk areas because any delays in the preceding activities can delay the successor activity. 2. Evaluate Predecessors: Examine all predecessor activities leading to a **merge point** to determine if they are necessary or if alternative logic can be applied to reduce the number of converging paths. 3. Assess **High Total Float**: Check if predecessors have **high total float**. If so, it may indicate poor sequencing or that some activities

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	are not essential for the successor. If many activities have little or no float, the risk of delay increases, and the plan should be re-evaluated. 4. Simplify Workflow: Avoid tying too many activities to a single milestone unless they are truly essential predecessors. Break up excessive parallel activities by linking some activities to other intermediate activities instead of the **merge point**. 5. Use Risk Analysis: Conduct a Schedule Risk Analysis (SRA) to understand how **merge bias** affects the schedule. The SRA will calculate the likelihood of completing **merge points** on time and help identify paths that need prioritization. 6. Plan Conservatively: Recognize that the timing of **merge points** is determined by the latest finishing predecessor. Build realistic schedules that account for the added risk and avoid overly aggressive timelines. 7. Monitor Key **Merge Points**: Regularly track progress at critical **merge points**, as these are often tied to major project milestones. Adjust schedules as necessary to address emerging risks.

NASA Scheduling Management Handbook	
From The Document (Direct Text)	The word "**merge**" was not mentioned in the document.

Appendix C - Primavera P6 vs Microsoft Project Methods and Calculations

Primavera P6 vs. Microsoft Project: how is total float (slack) calculated?

Total Float (Slack) is calculated through a two-pass process in scheduling software:

Forward Pass:

- Start at project beginning
- Calculate Early Start (ES) and Early Finish (EF) dates for each activity
- EF = ES + Duration
- Next activity's ES = Previous activity's EF (following logic links)

Backward Pass:

- Start at project end
- Calculate Late Start (LS) and Late Finish (LF) dates for each activity
- LS = LF - Duration
- Previous activity's LF = Next activity's LS (following logic links)

Total Float Formula:

- Total Float = Late Start - Early Start
- Or equivalently: Total Float = Late Finish - Early Finish

This means total float represents the difference between when an activity could start (Early Start) and when it must start (Late Start) to avoid delaying the project end date. The calculation takes into account network logic (activity predecessors and successors), calendars, and constraints.

A key point: The value will be the same whether you calculate using start dates or finish dates, as they're just offset by the activity's duration.

Primavera P6 vs. Microsoft Project: is there a different way to constrain or put a deadline on the discrete project finish to calculate accurate total float?

Yes, each tool handles project end constraints differently for total float calculations:

Microsoft Project:

- Use "Deadline" dates (preferred) - These show negative float without constraining the schedule
- Or use "Must Finish By" constraint - Forces the schedule end but can artificially constrain network logic
- Project will calculate negative float if activities extend beyond these dates

Primavera P6:

- Use "Project Must Finish By" (PMFB) - Sets a project-level constraint date
- Or use "Finish On or Before" constraint on final milestone
- P6 will calculate negative float for any activities that would finish after the constraint
- Float calculations respect this date while still allowing the schedule to extend beyond it if needed

Key Difference:

MS Project treats deadlines as more of a warning indicator, while P6's PMFB acts as a true schedule boundary for float calculations. In P6, the PMFB is specifically designed to establish the reference point for backward pass calculations, making it the preferred method for ensuring accurate total float values across the network.

Appendix D – Push / Pull Tests Process Steps

Push Test

- It is strongly recommended that this test be conducted in a copy of the P6 Schedule, not the official live P6 file for the Project. Push Test
  1. Constrain CD-4 activity (or activity at end of project) to "Finish On or Before." (Make Note of the Activity ID & Total Float)
  2. Choose an activity within the current 6-month window that is discrete and between 10 to 100 days total float and not on longest path. (Make Note of the Activity ID & Total Float)
  3. Add 500 days to remaining duration to the selected activity.
  4. Reschedule the project.
  5. Verify the results.
     a. The total float of the statused activities are now prior total float minus 500 days.
     b. The change to the end milestone which should be negative by the same amount as 5a.
     c. Verify that LOE activities are not on the Longest Path.
     d. The negative float total is reasonable - the longest path changed and the right activities were impacted.
  6. If 5a though 5d are true, return the activity in step 2 to its original duration and scheduled the project. Then select another activity in a different WBS and repeat the test.
  7. If 5a through 5d are true, enter 0 for the X-Value. If false, enter 1.
  8. This metric is conducted four times. Two in the Baseline IMS and two in the Forecast IMS. For subsequent tests use another activity near the end of the project.

Make sure to reset the duration of the activity back to the original duration and schedule the project (F9).

Pull Test

It is strongly recommended that this test be conducted in a copy of the P6 Schedule, not the official live P6 file for the Project.

- Pull Test #1

Filter for the Longest Path or the Driving Path you are evaluating. Either copy and past these activities into an offline Excel file or use a UDF code field to code them with a character or number.

1. Select the last discrete activity on the longest path or the interim project milestone. (Make Note of the Activity ID & Total Float).
2. Constrain the last discrete activity or the interim project milestone to the current status date.
3. Reschedule the project. Significant negative total float should result.
4. Verify the results. (Filter out Complete and LOE Activities from results)

   a. No discrete activity should have 0 or positive float.
   b. The prior longest path or interim milestone should still be the same. Either copy the path in the offline Excel file and compare or check the coded UDF field to ensure all tasks are still present.
5. Reset the constraint to the original date.
6. Remove filters for Complete and LOE Activities. Clear any UDF codes added during the test.

- Pull Test #2
  1. Select a future LOE activity.
  2. Change the start date to the current status date.
  3. Reschedule the project.
  4. Verify results.
     a. No other discrete activities should be associated with the repositioning of the LOE activity.

Push/pull tests, which should be run against a copy of the risk-adjusted schedule, to ensure the schedule network integrity reacts as expected (i.e. constraints, excessive float, etc. are not prohibiting the network from reacting as expected). Nuances may cause the push/pull test to fail, so all interested parties need to be aware of the nuances that can cause the network to not move as expected. Both tests examine the baseline IMS critical path's reaction to changes in activity durations.

The pass/fail of the push/pull tests is only the initial step for the schedule SME. The schedule SME should then investigate and understand the cause of the failed test.