Project Delivery Plan Optimisation Metrics: Recovery Gap [1]

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Abstract

For decades, project scheduling has relied on Total Float (TF) as a core network-analysis metric - describing how long an activity can be delayed without affecting the project's predicted completion date. Despite its apparent simplicity, TF remains one of the most misunderstood concepts in scheduling. Inconsistent definitions across software, standards, and guidelines have created ambiguity, particularly when TF appears as a negative value, contradicting its definition as a measure of allowable delay.

This paper introduces a complementary metric, Recovery Gap (RG), to clarify schedule interpretation by distinguishing forecast-driven and target-driven completion perspectives. While TF indicates how much delay is possible before impacting the forecast finish, RG quantifies deviation from specific target deadlines. A negative RG value expresses the amount of acceleration required to meet the target completion date.

Three derivative forms, Recovery Gap Start, Recovery Gap Finish, and Super Recovery Gap, provide a structured framework for evaluating how individual activities align with project objectives and deadlines. Using practical examples, including resource-optimisation cases, this paper demonstrates how reliance on a single metric can mislead project teams, and how combining TF, RG, and related analytical metrics produces more accurate insights and more effective schedule-optimisation strategies.

Total Float Definitions

A persistent misconception within network-analysis methods, including the Critical Path Method (CPM**)**, is that TF can legitimately assume positive, zero, or negative values. Although definitions vary, most agree that TF represents the amount of time an activity may be delayed without affecting the project's completion or committed target events.

Representative definitions include:

- ***Definition N1a:*** Time by which activity can be delayed or extended without affecting the total project duration or delay finish date. (Planning, Scheduling, Monitoring and Control, Association for Project Management, UK)

- ***Definition N1b:*** The amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule

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constraint. (Practice Standard for Scheduling, 3rd edition, Project Management Institute, USA)

- ***Definition N1c:*** The amount of time an activity can be delayed or extended before delay affects the program's finish date. (GAO Schedule Assessment Guide, GAO, USA)

- ***Definition N1d:*** The maximum number of work periods by which an activity can be delayed without delaying project completion or violating a target (milestone) finish date. (10s-90 Cost Engineering Terminology, AACE International)

- ***Definition N1e:*** The number of work periods the start or finish of an activity can be delayed without affecting the project finish date. Float is measured in hours, days, weeks, or months depending on the project's planning unit, and can have negative, zero, or positive values. (10s-90 Cost Engineering Terminology, AACE International)

- ***Definition N1f:*** The amount of time a task can be delayed without delaying the finish date of the project. (10s-90 Cost Engineering Terminology, AACE International)

- **Definition N1g:** Is defined as the number of workdays an activity's finish date can slip before impacting the program's end date. (Planning & Scheduling Excellence Guide, National Defense Industrial Association, 4th edition)

- **Definition N1h:** The amount of time an activity may be delayed without extending the critical path. (Praxis Framework)

While seemingly straightforward, these definitions contain subtle ambiguities arising from the use of terms that carry multiple interpretations.

Project delivery date

The terms *project finish date* and *project delivery date* are commonly used in two distinct contexts:

a) Target / Deadline / Commitment Delivery Date ("Deadline" below):
This refers to the date by which a specific project event or deliverable must be completed, as defined in a contract, stakeholder agreement, business case, or client expectations. It represents a *target* or *obligated* completion point.

b) Forecast Delivery Date ("Forecast date" below):
This represents the current estimate of when the project deliverable is expected to be completed, based on the schedule model, recorded progress, and remaining work. Within the framework of network analysis methods, the Forecast Delivery Date is the *analytically derived* outcome of the scheduling calculation.

Deadline	Forecast date
Fixed: Often baselined at the start of the project or phase and doesn't change easily.	Dynamic: Changes as progress is reported and risks or changes are incorporated.
Acts as a target for the project team.	Reflects reality - what the data and current circumstances say.

Table 1: Project delivery date

Schedule constraint

Another key term that frequently appears in TF definitions is *schedule constraint*, which is itself used in multiple ways. Some definitions recognise that TF can be evaluated relative to a target other than the project end date, but many do not. The term *constraint* is often used as a proxy for *deadline*, although not every schedule constraint is a deadline.

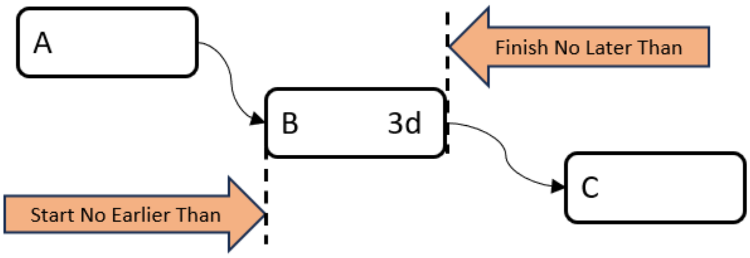
There are multiple types of 'schedule constraint' that impact the calculation of TF.

a) **Start No Earlier Than (SNET):**

Specifies that an activity can't begin before a specific date, typically due to external dependencies or conditions, even when all logical predecessors have been completed.

b) **Finish No Later Than (FNLT):**

Requires that an activity or milestone be achieved by a specified date. This is the most common way project deadlines are represented within scheduling systems.



Picture 1.1

c) **Activity Calendar Constraints:**

Impose activity-specific working windows (e.g., seasonal works, shutdown periods, regulatory windows) that can limit when work may occur.

d) **Resource Calendar Constraints:**

Restrict execution to periods when assigned resources (personnel, equipment, materials) are available. Activity and resource calendars often heavily influence early and late dates for activities and, therefore, TF. Still, usually they are not explicitly considered as a schedule constraint when TF is defined.

e) Project completion date constraint

Imposes a specific completion date for the overall project, or the date is calculated during CPM analysis. This is usually treated as a target date when TF is calculated.

In practice, however, delivery teams are more interested in understanding float relative to committed events. The final project completion date often carries lower practical criticality, as delays in closeout activities typically have little effect on actual project outcomes.

Below in this paper, the term *constrained event* refers to an activity or milestone that has either:

- has a *Finish No Later Than* constraint representing a deadline, or
- a project completion date.

There are other network analysis elements that project practitioners call constraints: Priorities (ASAP/ALAP), ‘Must have’ constraints, etc.

The calculated TF value can vary significantly depending on which constraint types are included in the analysis, and different scheduling systems implement them inconsistently, leading to discrepancies in TF values for the same logical model.

Delayed or extended

Delaying an activity’s start and extending its finish are not equivalent actions and may affect project targets differently.

Early TF formulations typically focused only on delay from the early start. More recent definitions have expanded the concept to include extension of the finish. In later sections, this paper distinguishes and quantifies the separate influence of start and finish movements on both the forecast and the deadline using additional metrics.

The calculated TF value can vary significantly depending on which version of the terms serves as the basis for the analysis. Different scheduling systems implement them inconsistently, leading to discrepancies in TF values for the same logical model.

Recovery Gap

To eliminate ambiguity, it is essential to clarify which meanings of *Project Delivery Date* and *Schedule Constraint* apply when calculating *the TF metric.*

Since TF describes "how long an activity **can be delayed**," it logically can't be negative. An activity can't be delayed by a negative period. TF should thus be **≥ 0**.

At the same time, an activity may still appear *behind schedule* relative to a *project's target date*, described as a *Deadline*. In such cases, an additional metric is essential to analyse this perspective.

For effective project planning, and control, it is crucial to identify which set of activities determines the achievable date, forecast, for *constrained events* - these are the activities with TF = 0.

To clearly separate these perspectives, this paper introduces a new metric: **Recovery Gap (RG)**.

Definition N2: **Recovery Gap** is a network analysis metric that quantifies the time required to bring an activity back on track to meet one or more project targets. A negative recovery gap value indicates that schedule acceleration is required; a positive value indicates available float relative to the deadlines.

The term "Recovery Gap" is deliberately chosen to avoid confusion with TF and to make explicit that the metric measures the recovery effort needed to restore compliance with the project's committed dates.

How does Recovery Gap differ from Total Float?

Although related, TF and RG answer different questions and should be treated as complementary, not interchangeable, metrics.

Total Float: Measures how long an activity can be delayed without affecting the project's *forecast* constrained events.

- TF = 0: The activity lies on the critical path; any delay extends the constrained event forecast date.
- TF > 0: The activity has schedule flexibility; delays up to the TF value do not affect the constrained event forecast date.

Recovery Gap:

Measures how much acceleration is needed for an activity (or group of activities) to meet the target completion date.

- RG < 0: The activity is behind the target dates and requires recovery.
- RG = 0: The activity is precisely aligned with the target dates.
- RG > 0: The activity is ahead of the target dates.

In summary:

RG informs us of the required level of acceleration to meet the target dates. TF tells us where acceleration could influence the forecast completion date.

An activity lagging behind its target date (RG<0) may or may not have a TF=0.

- **If TF = 0, any delay will push out a constrained event**
- **If TF > 0, the activity delay that is less than the TF value will not cause additional delay.**

Other considerations:

- Acceleration applied to activities with RG < 0 but TF >= 0 will not reduce project duration; it will only improve alignment with the deadline without changing the forecast dates.

- It is possible for an activity's RG to exceed its total duration. In such cases, accelerating that activity alone will not be sufficient to recover the project's target date - acceleration must also be applied to other related activities within the network.

- Furthermore, even if the project team identifies opportunities to accelerate delivery, by applying corrective actions to activities on the critical path (those with TF = 0) or by modifying the critical path logic, the anticipated acceleration may not have the desired effect if these actions adversely affect activities with a negative RG. The paper later explores such scenarios in detail.

Before reviewing RG scenarios, it is necessary to introduce another schedule analysis metric - Activity Drag.

Activity Drag

The **Activity Drag** ('Drag' below) metric is closely related to schedule acceleration and complements TF and RG.

Definition N3: **Activity Drag** is the amount of time that could potentially be saved on the project by reducing the duration of the activity (or removing the activity completely) [13].

Assume that a set of activities has negative RG values, indicating that acceleration is required.

- **RG** indicates the required level of acceleration to align with deadlines.

- **TF** indicates where reductions in duration can potentially shorten the forecast completion.

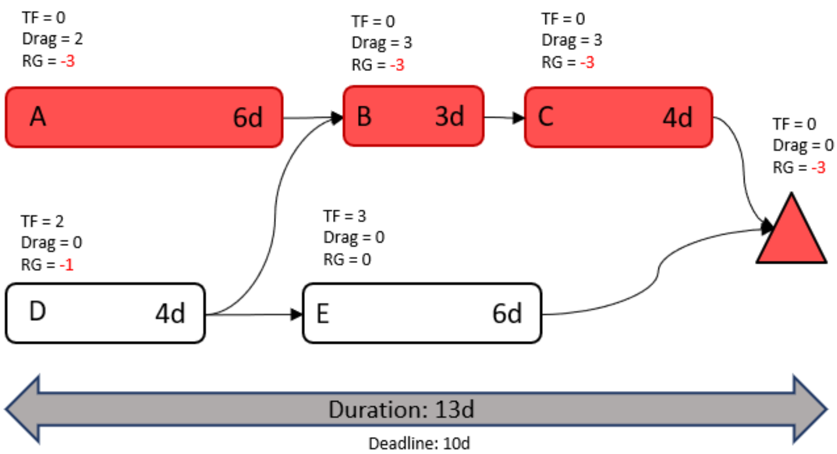
- **Drag** quantifies the *maximum possible schedule benefit* of reducing a specific activity's duration.

Drag itself does not specify *how* acceleration is achieved (e.g., additional resources, calendar changes, productivity improvements). Therefore, RG must be analysed to assess whether the chosen acceleration strategy (such as resource reallocation) is feasible without negatively affecting other parts of the network.

In combination, TF, RG, and Drag provide the necessary information for effective schedule optimisation and recovery.

Scenario 1: Interplay of TF, RG, and Drag

Consider a scheduling scenario where activities A, B, and C all have TF = 0 and together define the earliest achievable project completion date of 13 days. This is the forecast completion.



Picture 2.1

The project's target is to complete the final milestone within 10 days. The critical path activities (A, B, C) each have RG = –3 days, indicating that each is three days behind the target-based alignment. Additionally, Activity D, on a near-critical parallel path, has RG = -1 day but TF > 0.

The metrics signal that:

- Reducing the duration of activities A, B, or C will tend to shorten the project forecast (they are on the critical path).
- Improving Activity D alone will not shorten the forecast duration, because it retains positive TF.
- However, Activity D is already behind the deadline (RG = -1), and degrading it further could compromise the project's ability to meet the target date even if the forecast finish is improved elsewhere.

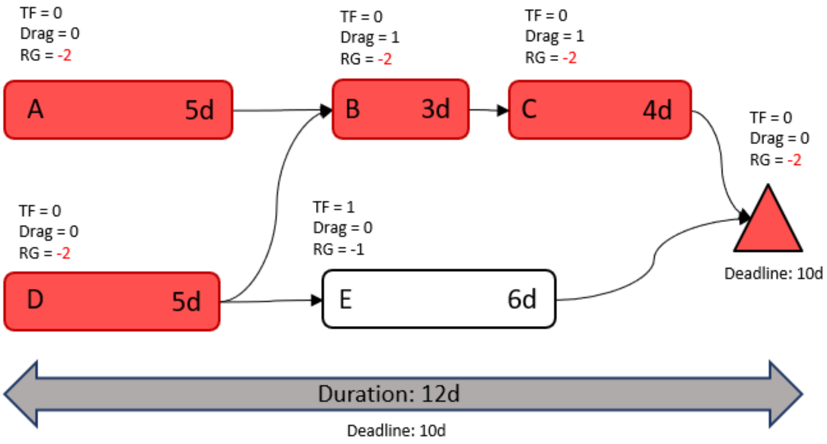
The project team needs to find out where accelerations are possible, and the Drag metric provides this indication.

Assume that Activity A's duration is directly proportional to the number of assigned resources. Doubling resources could reduce the duration of Activity A from six to three days. The Activity

Drag for A is two days, indicating that even if its duration could be shortened by three days the maximum reduction in overall project duration is two days.

Let's continue the schedule analysis with Activity A. Assuming the project may relocate resources from parallel Activity D to Activity A, and both activities are effort-driven: the realignment reduces Activity duration A by two days and increases Activity D duration by two days. RG of Activity D = -1 day suggests that extracting resources from this activity may have a negative overall impact.

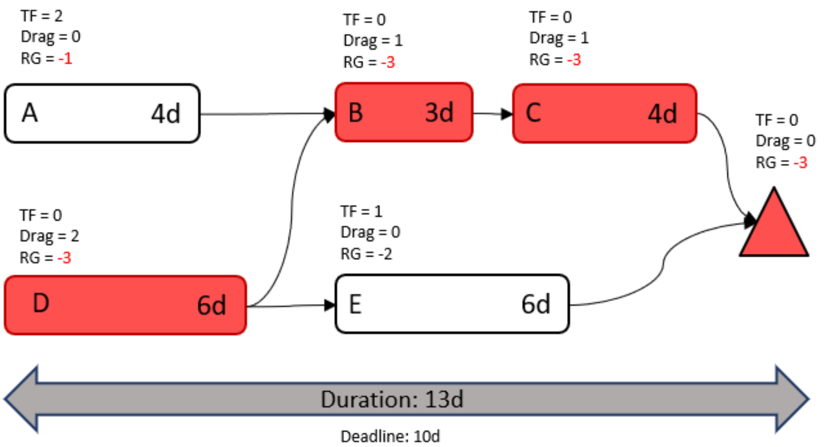
Let's apply a partial acceleration first: reduce Activity A by one day and increase Activity D by one day, as well.



Picture 2.2

The acceleration is achieved! Overall project duration is reduced by one day.

Now, let's apply the full acceleration action: reduce Activity A by two days (based on the original scenario) and increase Activity D by two days.



Picture 2.3

Activity A RG is decreased to -1 day, but the acceleration action has the opposite effect: the overall project duration increases back to 13 days.

Relocating resources from non-critical to critical activities reduces the duration of the original critical path but also increases the duration of the original near-critical path. It impacts the project critical path - the path is D, B, C, which has the same duration as the original critical path.

The RG metric gave us an earlier indication that such an effect is likely.

Total Float Start and Super Float

Now, some of TF definitions are updated by the "activity can be delayed or extended" statement, but initially, it was explicitly defined that TF measure deviation from the early start date.

Definition N1i: **Total Float** is the amount of time that an activity may be delayed from its early start without delaying the project finish date[1].

(A guide to the Project Management Book of Knowledge, 1st edition, 1996)

When practitioners discuss TF, we should refer to the *Total Float Start* ('TFs' below) metric, which indicates the amount of flexibility available to adjust the activity's start date without impacting the project's constraint event dates.

Definition N4: **Total Float Start** (TFs) measures the amount of time that an activity may be delayed from its early start without affecting achievable project constrained events.

A separate metric introduced by Vladimir Liberzon, Super Float (SF), measures the allowable extension of the finish date:

Definition N5: **Super Float** (SF) measure the time by which an activity's finish can be extended without affecting the achievable project constrained events.

In many schedules, TF and SF are identical. However, in more complex networks, they often diverge. If a task has incoming constraints or dependencies tied to its start, those may limit how much its start can be shifted, whereas the project logic may allow greater flexibility in shifting its finish. As a result, TF and SF can vary significantly.

Recovery Gap Start and Super Recovery Gap

The same principle can be applied to the RG metric. *Recovery Gap Start* ('RGs' below) focuses on bringing the start of an activity back into alignment with target dates.

Definition N6: **Recovery Gap Start** indicates the time required to bring start of an analysed activity back on track to meet project deadline(s) or available float when the activity start is delayed.

We offer to apply a new metric, *Super Recovery Gap* ('SRG' below), to measure the impact of extending the activity's finish on project target(s) dates.

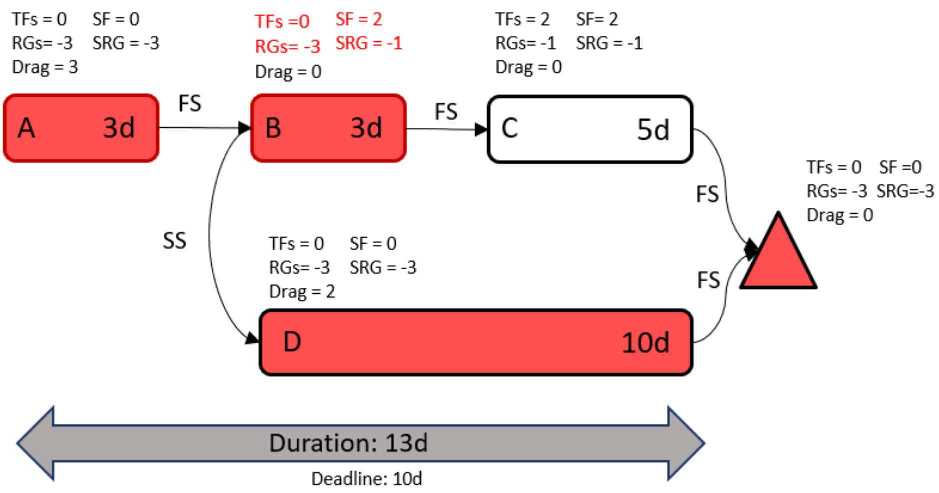
Definition N7: **Super Recovery Gap** (SRG) indicates the time required to bring finish of an analysed activity back on track to meet project deadline(s) or available float when the activity duration is extended.

Understanding these distinctions is essential for selecting the correct acceleration actions (e.g., pulling the start earlier vs compressing the execution or finish).

Scenario 2: Start vs Finish delay in the context of deadlines

In this scenario, activities A, B, and D define when the project can be delivered in 13 days.

The project's target is to deliver the final milestone within 10 days. The critical path is A → B → D, and these activities have RG = -3 days relative to the deadline.



Picture 3.1

Activities B and D are connected by a Start-to-Start relationship. If the start of Activity B is delayed, the project as a whole will also be delayed. However, extending Activity B's finish by up to two days does not further delay the project. For Activity B:

- TFs = 0 days
- SF = 2 days

With respect to the deadline:

- Activity B's start is three days behind target (RGs = -3 days).
- Activity B's finish is only one day behind target (SRG = -1 day).

Analysing TFs, SF, RGs, and SRG together allows the project team to:

- Recognise that delaying the start of B is critical,

- Understand that extending the finish has less impact (within limits), and
- Select acceleration measures that focus on the most constraining aspect (here, the start alignment).

RG in Resource-Driven Network Analysis Method

TF and RG can be applied to both:

- Task-Driven Network Analysis (also called Duration-Driven CPM, DCPM), and
- Resource-Driven Network Analysis (also known as Resource Critical Path Method, RCPM).

In DCPM, activity durations are fixed and independent of resource allocations. Resource demand is derived from those durations but does not influence them.

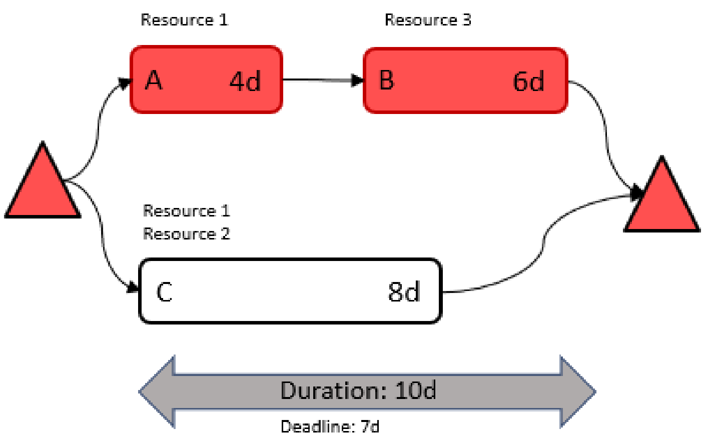
In RCPM, activity durations and sequences are actively influenced by resource assignments and limitations. This approach better reflects real project behaviour, as most activity durations are driven by resource availability, productivity, and other technological limits rather than having truly fixed durations.

If tasks are resource-loaded, it does not mean the schedule is RCPM-driven. The resource critical path is not calculated using the critical path method but also considers resource alignment.

As a result:

- TF and RG calculated under DCPM and RCPM may differ significantly.
- RCPM provides more realistic insights, but calculating TF, RG, and Drag in this context is more complex.

Scenario 3: Volume-Driven activity with resource options



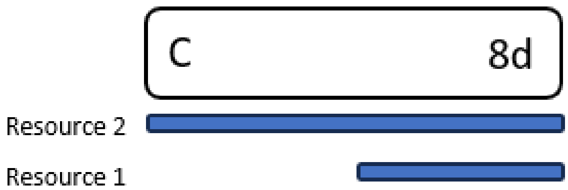
Picture 4.1

Consider an activity C that is volume-driven and can be carried out by one or two resources:

- Activity C has 96 units of volume.
- Each resource can process 1 unit per hour.
- Work calendar is 8 hours per day.

One resource (Resource 2) is available from day 1. The second resource (Resource 1) is available from day 5.

- With only Resource 2 from day 1, 32 units can be delivered in the first 4 days.
- When Resource 1 joins from day 5, two resources can process the remaining 64 units in 4 days.
- Total duration of Activity C under this assignment is 8 days.

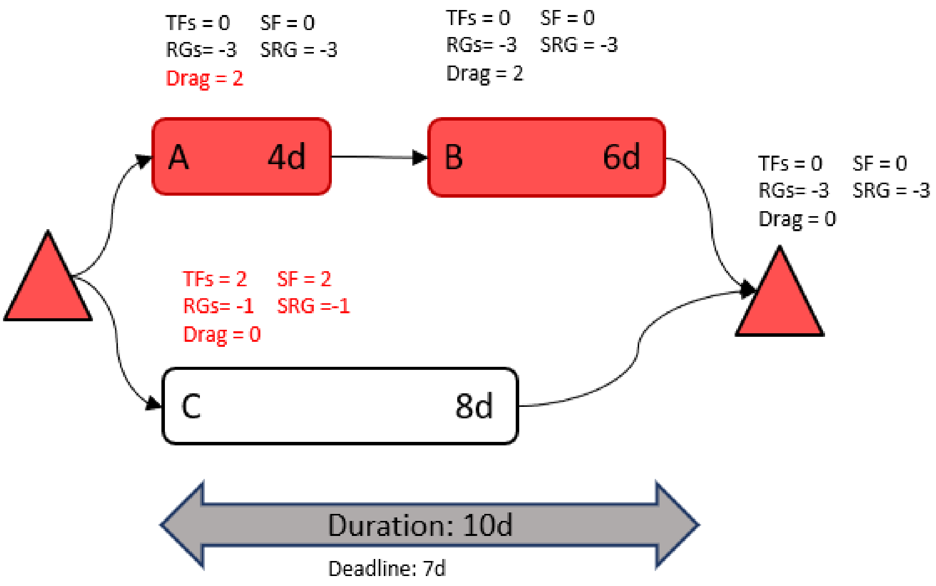


Picture 4.2

DCPM Perspective (Ignoring Resource Limitations)

Under DCPM, the way the duration of C is estimated is not standardised:

- If full resource availability is assumed during estimation, C could be given a duration of 6 days (assuming two resources throughout).
- If resource limits are included in estimation (but not in scheduling), C might be set at 8 days.

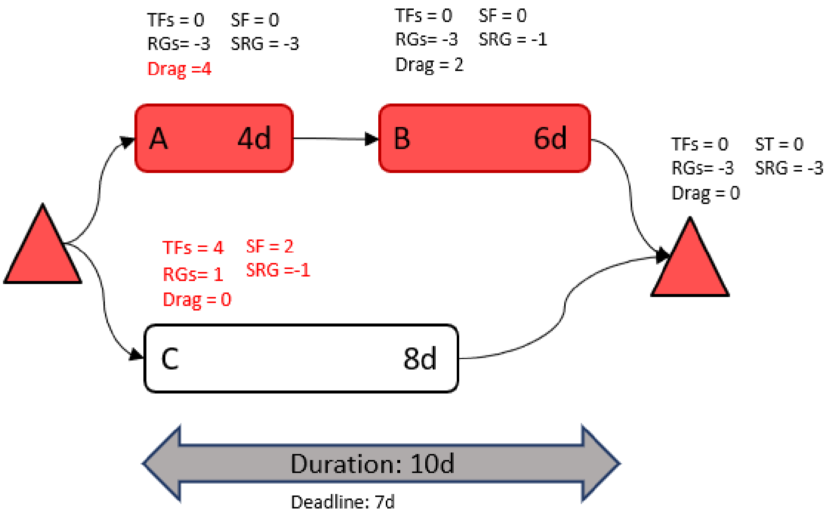


Picture 4.3

In a simple example where C has 8 days duration:

- TFs = 2 days
- SF = 2 days
- RGs = -1 day
- SRG = -1 day
- Drag for activities A and B is 2 days.

RCPM perspective (considering resource assignments)



Picture 4.4

In RCPM, if the start of Activity C is delayed by four days, both resources may be simultaneously available, allowing the 96 units to be delivered in 6 days. Thus, even with a four-day start delay, the project can still finish within the 10-day target, and:

- TFs become 4 days.
- SF remain 2 days.
- RGs become +1 day (start can slip), while
- SRG remain -1 day (finish cannot slip).

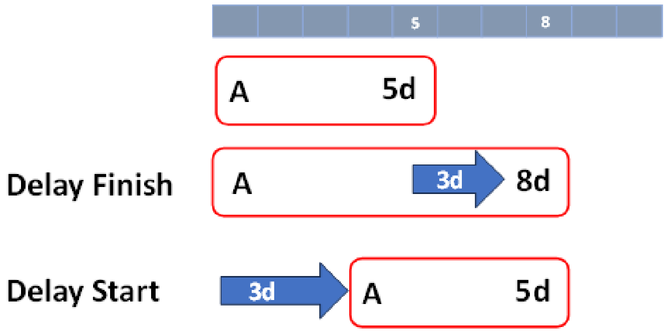
Moreover, this change can affect the Drag of other activities (Activity A), since the resource-driven recalculation reveals new acceleration possibilities.

This scenario illustrates that:

- DCPM-based metrics can be misleading in the presence of resource constraints.
- RCPM-based metrics provide a more realistic picture of project possibilities and risks.
- TF, RG, and Drag can all differ between DCPM and RCPM for the same logical network.

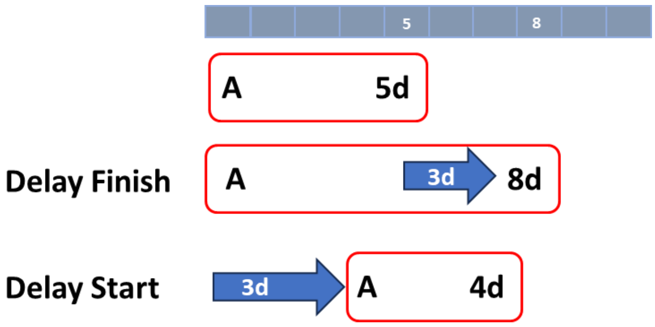
Total Float Finish and Recovery Gap Finish

In DCPM, where durations are fixed, delaying an activity's start or extending its finish over the same interval has the same effect on the activity's finish date and thus on the project's constraint events.



Picture 4.5

In RCPM, this is no longer necessarily the case. Because resource availability and calendars may vary over time, a delayed start can sometimes be partially offset by increased resource availability later, or vice versa. Consequently, delaying the start by a certain number of days may not translate into the same delay in the finish.



Picture 4.6

A similar effect can occur in a DCPM variant where effort is fixed, but activity duration is derived from task calendars. In such cases, working hours and planned progress are no longer linear, leading to non-uniform execution patterns.

It means an additional metric to measure the impact of the activity's Finish Date when the activity's start is delayed is essential. Total Float Finish (TFf below) can measure such an impact.

Definition N8: **Total Float Finish** measures time by which activity finish can be delayed by delaying activity start date without affecting achievable project delivery date.

Impact also needs to be analysed in the context of Deadline(s), and for that, we can propose a new metric *Recovery Gap Finish* (RGf below).

Definition N9: **Recovery Gap Finish** measures time by which activity finish can be delayed by delaying activity start date without affecting project Deadline(s) or available float when the activity start is delayed.

Usually activities have:

- TFs = SF = TFf, and

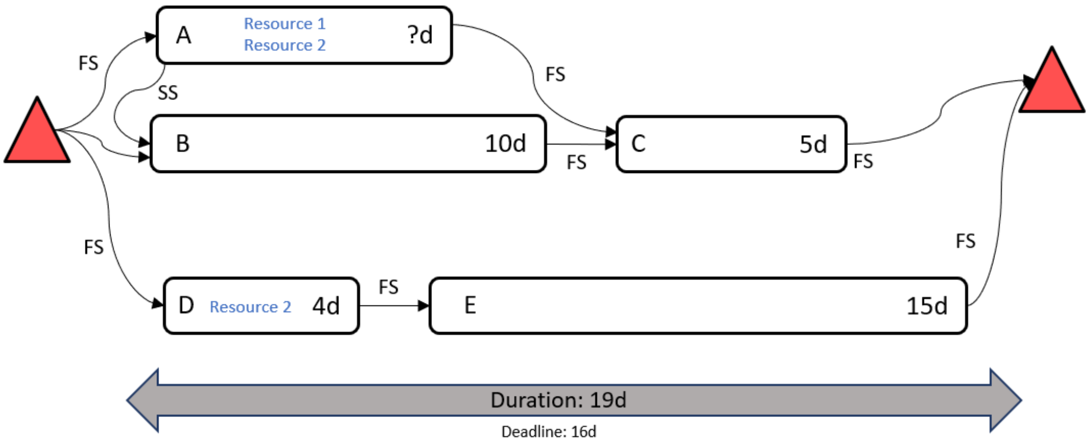
- RGs = SRG = RGf.

However, under resource-driven conditions or complex logic, these metrics can differ. Understanding these differences is critical in both predictive and forensic schedule analysis.

Scenario 4: Impact of resource assignment choices.

Consider a schedule with the following characteristics:

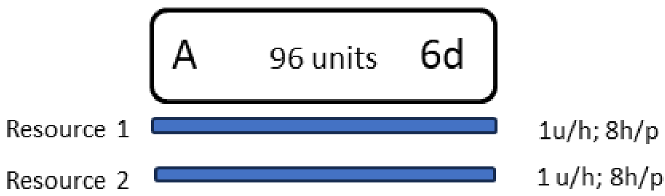
- Activities A and B are linked by a Start-to-Start dependency; all other relationships are Finish-to-Start.
- Activity D requires 'Resource 2'.
- Activity A is volume-driven with 96 units of volume, deliverable by one or two resources ('Resource 1' and 'Resource 2'), each with productivity of one unit per hour.



Picture 5.1

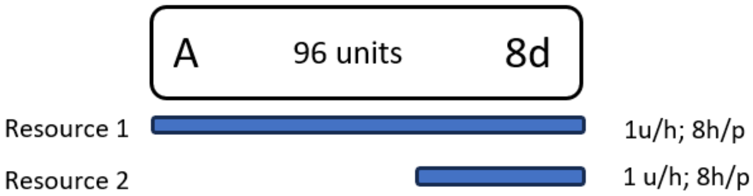
There are two alternative resource-assignment strategies:

1. 'Resource 2' starts on Activity A:
   - With Resources 1 and 2, Activity A can be completed in 6 days.
   - Activity D can only start on day 7.
   - The resource-critical path becomes A → D → E.
   - Overall project duration is 25 days.



Picture 5.2

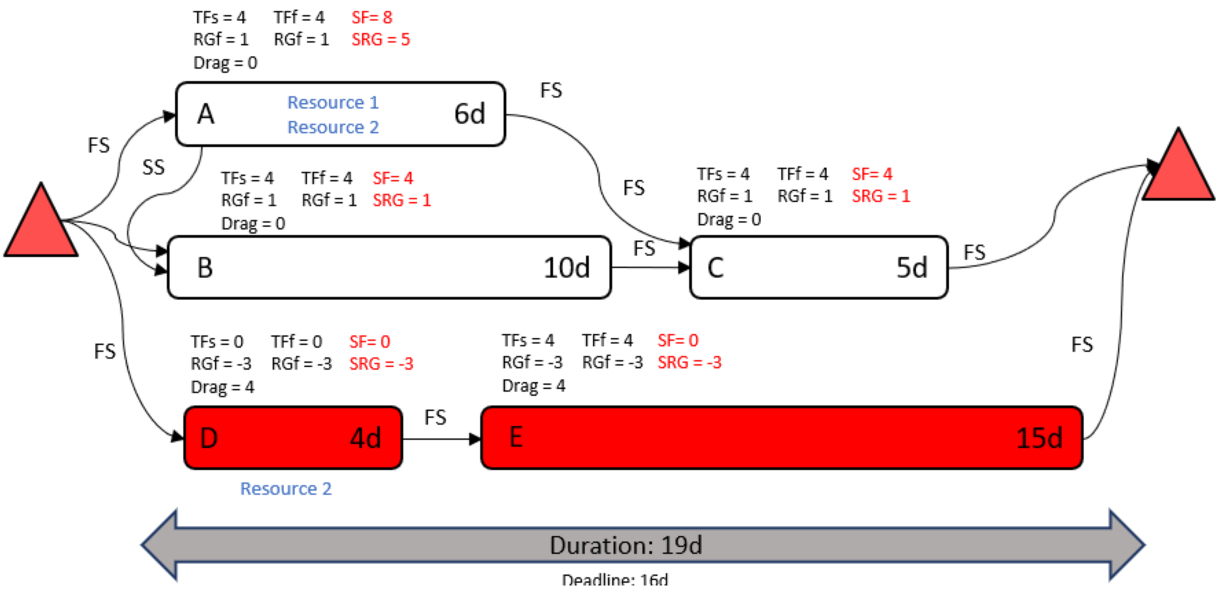
2. 'Resource 2' starts on Activity D:
    - Activity D can commence on day 1.
    - Activity A starts on day 1 with Resource 1 only, and Resource 2 joins on day 5.
    - Under this pattern, Activity A has a duration of 8 days.
    - The resource-critical path becomes D → E.
    - Overall project duration is 19 days.



Picture 5.3

Now compare metrics calculated under DCPM (ignoring resource limits) and RCPM (considering them).

<u>DCPM metrics for Activity A</u>



Picture 5.4

Under DCPM, Activity A metrics are:

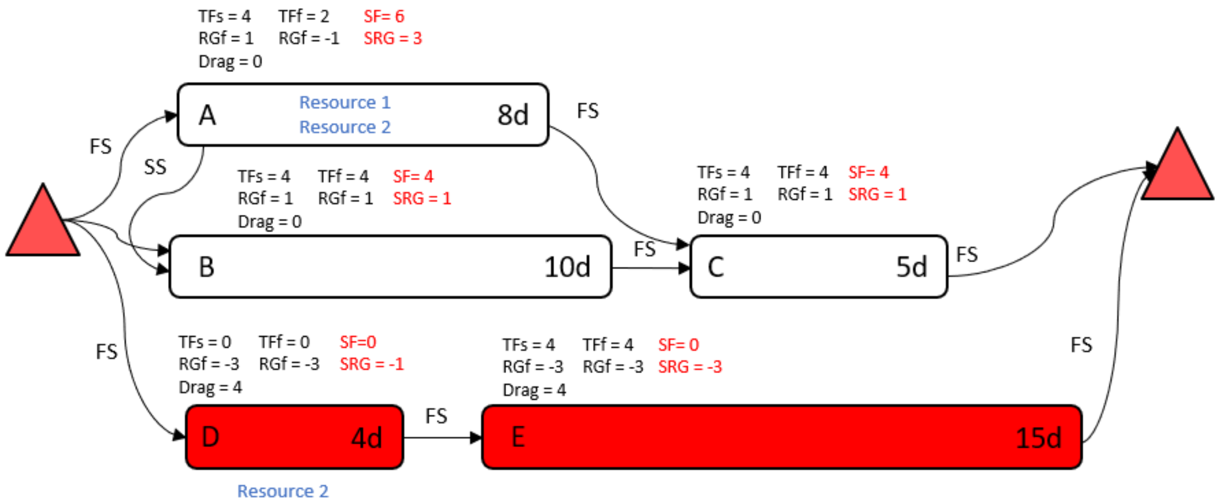
- TFs = 4 days
- TFf = 4 days
- RGs = 1 day
- RGf = 1 day

- SF = 8 days
- SRG = 5 days
- Drag = 0 days

This view suggests that:

- The start of Activity A can be delayed by one day relative to the deadline (RGs > 0).
- The finish can be extended by up to five days (SRG > 0).

RCPM metrics for Activity A



Picture 5.5

Under RCPM, taking resource constraints into account, Activity A metrics instead show:

- TFs = 4 days
- TFf = 2 days
- RGs = 1 day
- RGf = -1 day
- SF = 6 days
- SRG = 3 days
- Drag = 0 days

Now:

- RGs remains positive (start of A can move by one day without immediate deadline impact).
- However, RGf is negative: delaying the start in a way that also delays the finish does, in fact, impact the deadline.
- SRG is only 3 days, not 5.

It shows that the Finish of this activity has a different impact on the project deadline depending on whether the activity start is delayed or extended. We can't delay the start of the activity without further impacting the deadline date, but we can delay finishing up to three days.

Comparing these two views (Activity A):

Metric		DCPM	RCPM
Activity Duration		6	8
Total Float Start	TFs	4	4
Total Float Finish	TFf	4	2
Super Float	SF	8	6
Recovery Gap Start	RGs	1	1
Recovery Gap Finish	RGf	1	-1
Super Recovery Gap	SRG	5	3
Critical Path Activity Drag	Drag	0	0

Table 2: Schedule analysis metric for Activity A in scenario 4.

If predictive or forensic analysis were performed without considering TFf and RGf (or without RCPM), one might incorrectly conclude that delaying the finish of Activity A by one day has no impact on the project target, when in reality, under resource-driven conditions, it does.

Recovery Gap in scheduling systems

TF is a fundamental metric in network analysis, and most CPM-based systems compute it. However, their implementation details differ, especially when constraints and deadlines are introduced.

This section summarises how Primavera P6 (Release 24.12), Microsoft Project 2024, and Spider Project (version 25.09.134) handle TF and RG-related metrics.

Primavera P6

Primavera P6 can calculate:

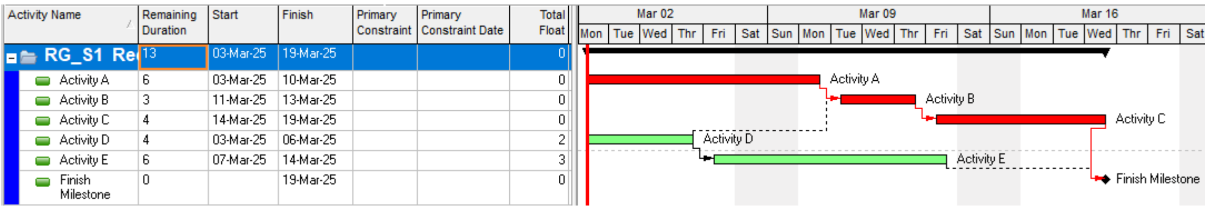
- TFs (Total Float relative to forecast completion)
- RGs (Total Float relative to deadlines, effectively)

for DCPM schedules. However:

- It is not possible to calculate and display both perspectives simultaneously.
- Both values are presented using the same field name (Total Float), which can be confusing.
- When deadlines are modelled using constraints (Finish On or Before), Primavera P6 effectively stop calculating TFs, and calculate RGs instead without indicating that the metric's meaning has changed.
- Without a deeper analysis, it is difficult to understand which metric is being calculated.

Metrics such as TFf, SF, RGf, SRG, and Drag are not natively supported, and TF calculations in resource-driven scenarios are often inaccurate.

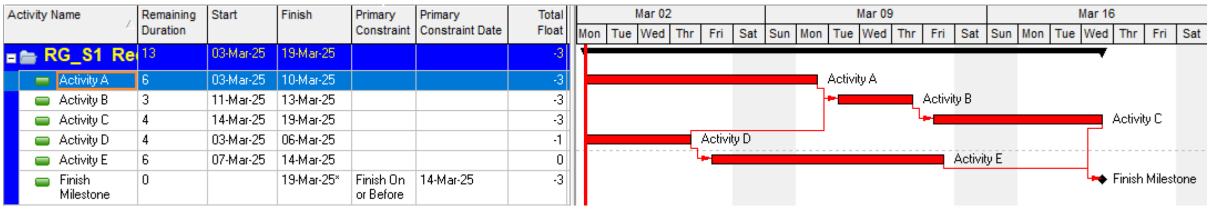
Scenario 1 without the deadline:



Activity Name	Remaining Duration	Start	Finish	Primary Constraint	Primary Constraint Date	Total Float
RG_S1 Re	13	03-Mar-25	19-Mar-25			0
Activity A	6	03-Mar-25	10-Mar-25			0
Activity B	3	11-Mar-25	13-Mar-25			0
Activity C	4	14-Mar-25	19-Mar-25			0
Activity D	4	03-Mar-25	06-Mar-25			2
Activity E	6	07-Mar-25	14-Mar-25			3
Finish Milestone	0		19-Mar-25			0

Picture 6.1

The scenario with the deadline:



Activity Name	Remaining Duration	Start	Finish	Primary Constraint	Primary Constraint Date	Total Float
RG_S1 Re	13	03-Mar-25	19-Mar-25			-3
Activity A	6	03-Mar-25	10-Mar-25			-3
Activity B	3	11-Mar-25	13-Mar-25			-3
Activity C	4	14-Mar-25	19-Mar-25			-3
Activity D	4	03-Mar-25	06-Mar-25			-1
Activity E	6	07-Mar-25	14-Mar-25			0
Finish Milestone	0		19-Mar-25*	Finish On or Before	14-Mar-25	-3

Picture 6.2

Microsoft Project

Microsoft Project also calculates TFs and RGs for DCPM schedules. In Microsoft Project:

- TF is represented as Total Slack.
- Task-level targets can be specified using the Deadline field.

As with Primavera P6:

- When deadlines are introduced, the system effectively displays RGs under the Total Slack field, i.e., it mixes TF and RG.
- Both TFs and RGs cannot be viewed separately at the same time. If task constraints are added the system stop calculation TFs.

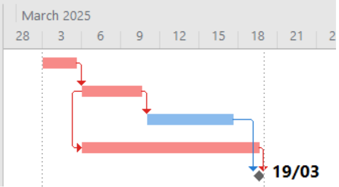
The system does not natively compute TFf, SF, RGf, SRG, or Drag. However, Microsoft Project allows the use of VBA macros, and the author has implemented:

- a macro to calculate TFs and RGs simultaneously[13], and
- a macro to calculate Activity Drag[3].

Microsoft Project also has fields such as Start Slack and Finish Slack, but these do not consistently correspond to TFs, TFf, or SF as defined in this paper.

Scenario 2 without the deadline:

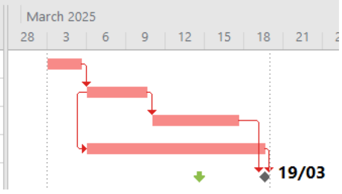
Task Name	Duration	Start	Finish	Deadline	Total Slack	Start Slack	Finish Slack
Activity A	3 days	3/03/25	5/03/25	NA	0 days	0 days	0 days
Activity B	3 days	6/03/25	10/03/25	NA	0 days	0 days	0 days
Activity C	5 days	11/03/25	17/03/25	NA	2 days	2 days	2 days
Activity D	10 days	6/03/25	19/03/25	NA	0 days	0 days	0 days
Milestone	0 days	19/03/25	19/03/25	NA	0 days	0 days	0 days



Picture 6.3

Scenario 2 with the deadline:

Task Name	Duration	Start	Finish	Deadline	Total Slack	Start Slack	Finish Slack
Activity A	3 days	3/03/25	5/03/25	NA	-3 days	-3 days	-3 days
Activity B	3 days	6/03/25	10/03/25	NA	-3 days	-3 days	-3 days
Activity C	5 days	11/03/25	17/03/25	NA	-1 day	-1 day	-1 day
Activity D	10 days	6/03/25	19/03/25	NA	-3 days	-3 days	-3 days
Milestone	0 days	19/03/25	19/03/25	14/03/25	-3 days	-3 days	-3 days



Picture 6.4

Spider Project

Spider Project the only scheduling system that can compute all the discussed metrics in both DCPM and RCPM modes. Its corresponding metrics are:

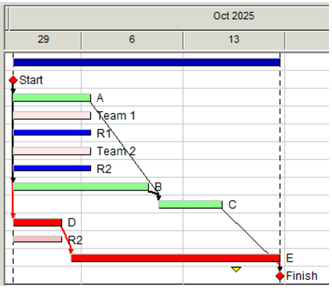
- TFs is Float Total
- TFf is Float Total Finish
- SF is Float Super.
- RGs is Float Negative Start
- RGf is Float Negative Finish
- SF is Float Super
- SRG is Float Super Negative

The SRG metric was introduced into the system following the author's recommendation. Its name, *Float Super Negative*, was selected to remain consistent with the existing family of metrics. Historically, the Float Negative group has been used primarily to quantify project delays (when values are negative). However, because these metrics can also take positive values, the chosen name may confuse new users.

Scenario 4 calculated in Spider Project:

DCPM calculation:

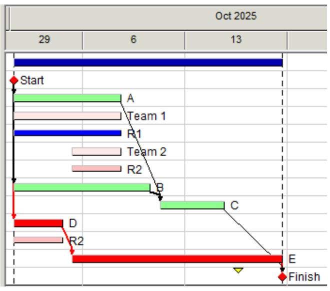
Code	Name	DPH type	Volume [Remaining]	Start	Finish	Finish [NLT]	Duration, Days [Remaining]	Float total, Days	Float total, Finish, Days	Float super, Days	Float negative, Start, Days	Float negative, Finish,	Float super, negative, Days	DRAG, Days
Scenario4				**01/10/25**	**19/10/25**		**19.00**							
1	Start	Milestone	100.00	01/10/25	01/10/25						-3.00	-3.00	-1.00	
2	A	Productivity	96.00	01/10/25	06/10/25		6.00	4.00	4.00	8.00	1.00	1.00	5.00	
1	Team 1		48.00	01/10/25	06/10/25		6.00	4.00	4.00					
A	R1	Productivity	48.00	01/10/25	06/10/25		6.00	4.00	4.00					
2	Team 2		48.00	01/10/25	06/10/25		6.00	4.00	4.00					
B	R2	Productivity	48.00	01/10/25	06/10/25		6.00	4.00	4.00					
3	B	Duration	100.00	01/10/25	10/10/25		10.00	4.00	4.00	4.00	1.00	1.00	1.00	
4	C	Duration	100.00	11/10/25	15/10/25		5.00	4.00	4.00	4.00	1.00	1.00	1.00	
5	D	Duration	100.00	01/10/25	04/10/25		4.00				-3.00	-3.00	-3.00	4.00
B	R2	Duration	100.00	01/10/25	04/10/25		4.00							
6	E	Duration	100.00	05/10/25	19/10/25		15.00				-3.00	-3.00	-3.00	4.00
7	Finish	Milestone	100.00	19/10/25	19/10/25	16/10/25					-3.00	-3.00		



Picture 6.5

RCPM calculation:

Code	Name	DPH type	Volume [Remaining]	Start	Finish	Finish [NLT]	Duration, Days [Remaining]	Float total, Days	Float total, Finish, Days	Float super, Days	Float negative, Start, Days	Float negative, Finish,	Float super, negative, Days	DRAG, Days
Scenario4				**01/10/25**	**19/10/25**		**19.00**							
1	Start	Milestone	100.00	01/10/25	01/10/25						-3.00	-3.00	-1.00	
2	A	Productivity	96.00	01/10/25	08/10/25		8.00	4.00	2.00	6.00	1.00	-1.00	3.00	
1	Team 1		64.00	01/10/25	08/10/25		8.00	4.00	2.00					
A	R1	Productivity	64.00	01/10/25	08/10/25		8.00	4.00	2.00					
2	Team 2		32.00	05/10/25	08/10/25		4.00		2.00					
B	R2	Productivity	32.00	05/10/25	08/10/25		4.00		2.00					
3	B	Duration	100.00	01/10/25	10/10/25		10.00	4.00	4.00	4.00	1.00	1.00	1.00	
4	C	Duration	100.00	11/10/25	15/10/25		5.00	4.00	4.00	4.00	1.00	1.00	1.00	
5	D	Duration	100.00	01/10/25	04/10/25		4.00				-3.00	-3.00	-1.00	4.00
B	R2	Duration	100.00	01/10/25	04/10/25		4.00							
6	E	Duration	100.00	05/10/25	19/10/25		15.00				-3.00	-3.00	-3.00	4.00
7	Finish	Milestone	100.00	19/10/25	19/10/25	16/10/25					-3.00	-3.00		



Picture 6.6

Scenario N4, when calculated in Spider Project under both DCPM and RCPM, produces the metric sets comparable to those summarised in Table 2.

The system correctly identifies the Resource Critical Path as calculating TF for all activities.

Popular scheduling systems, except Spider Project, either do not provide the full set of relevant metrics or calculate them inconsistently, which undermines robust project analysis.

Recovery Gap in scheduling guidelines and frameworks

Major project-scheduling standards and guides including:

- PMI's Practice Standard for Scheduling,
- GAO's Schedule Assessment Guide,
- AACE International Recommended Practices,
- NDIA's Planning and Scheduling Excellence Guide (PASEG), and
- NASA's Schedule Management Handbook

documents typically treat TF and RG as a **s**ingle metric, usually under the label 'Total Float.'

They acknowledge that TF can take negative values when deadlines or constraints are imposed, but they do not explicitly distinguish between:

- float relative to the forecast completion, and
- float relative to commitment or target dates.

It contradicts the TF definitions in these documents, which explicitly state that TF measures possible delay.

As a result:

- Some practitioners interpret TF as being measured purely relative to the project's forecast completion date.
- Others interpret TF as being calculated relative to constrained events.
- Still others assume TF implicitly reflects float against contractually committed dates.

In practice:

- Project managers and planners working with execution schedules tend to be more interested in the TF view, that support them identify drivers of schedule optimisation and acceleration.
- Planners and schedulers working with contract schedules may focus on the RG view as it supports delay claim analysis.

Because both groups use the same term (Total Float) for different underlying concepts, misunderstandings are common.

When only RG-type values are available (e.g., TF with negative values relative to deadlines), it becomes difficult to identify:

- which activities truly drive the current forecast completion date, and
- where acceleration will actually shorten the project duration.

As noted earlier, acceleration applied to activities with RG < 0 and TF > 0 may improve deadline alignment with constrained events but not shorten the project's overall duration.

Project practitioners mistakenly treat Recovery Gap as Total Float and apply an acceleration that has no effect.

Summary

Total Float (TF) remains a core metric in network-based schedule analysis, indicating how long an activity can be delayed without affecting project *constrained events*. It also plays a central role in forensic schedule analysis.

However, existing guidelines and many scheduling systems implicitly merge two distinct perspectives: for which period the activity can be delayed in the context of:

- forecast dates of project-constrained events
- target dates of project-constrained events

This merging leads to conceptual and practical confusion. Definitions that describe TF as "how long an activity can be delayed" sit uneasily alongside explanations that TF can be negative, contradicting the idea of "allowable" delay.

This paper addresses the ambiguity by explaining different types of TF metrics, the Activity Drag metric and introducing a complementary metric, Recovery Gap (RG). RG is explicitly defined as a measure of alignment against deadlines or commitments.

The concept includes a set of three metrics: Recovery Gap Start, Recovery Gap Finish, Super Recovery Gap. They indicate where the Start and Finish of the analysed activity stand against imposed targets.

These metrics can be applied in both duration-driven and resource-driven network analysis methods. Resource-driven analysis more accurately represents how real projects behave but requires more advanced calculations. Unfortunately, most scheduling systems either lack these analytical capabilities or apply them inconsistently.

Viewing schedules from both the forecast and the target perspectives is essential for reliable schedule analysis, optimisation, and recovery. Separating these viewpoints eliminates ambiguity, improves decision-making, and strengthens the link between analytical results and real project delivery performance.

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AI Declaration: This work was entirely written by the author. GenAI systems were used solely for editorial purposes. Particularly, Grammarly (https://www.grammarly.com/) was used to verify and correct spelling and grammar errors. Sometimes the system suggested rephrasing a sentence or part of a sentence.

About the Author

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Alex Lyaschenko is a planning and delivery consultant with over 25 years of experience in project portfolio management across different industries and countries. He holds a Master's degree in Mathematics from Odesa Mechnikov National University and began his career in the technology sector, and was at the origins of project management in Ukraine. He worked at Ukraine's first project management consulting firm, where he helped establish project delivery offices across different industries and trained future project consultants.

After relocating to Australia, Alex contributed to multiple portfolio and program offices, supporting organisations in defining their vision, enhancing project delivery practices, developing standards, implementing PPM tools, and upskilling teams.

Passionate about merging data with actionable strategies, Alex continues to shape the project management field by delivering insightful presentations and practical solutions that empower organisations to make data-driven decisions. As a speaker, Alex has presented at numerous project management conferences, contributed to the 8th edition of the PMBOK Guide, and had his articles featured in leading industry publications.

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