TIME IMPACT ANALYSIS BASED ON RETROSPECTIVE VIEW

Jungjoo, Im

October, 2025

Session 3B: Current Key Issues in Claims-Delay Issue

Abstract

This paper explores the retrospective application of Time Impact Analysis (“TIA”) as a structured and defensible method for assessing Extension of Time (“EOT”) entitlements in complex construction projects. While the D&D Protocol’s Core Principle 4 designates TIA as a preferred technique, Core Principle 11 raises concerns when delay assessments occur after events have passed or works are completed. In practice, however, many EOT claims are submitted late, making retrospective use of TIA both necessary and inevitable.

Key enhancements for retrospective TIA include: (1) modeling Employer Risk Events as Fragnets - categorized into ‘Delayed Actions’ and ‘Significant Changes’; (2) ensuring progress and remaining durations reflect what was reasonably anticipated at each Data Date; and (3) defining logic links based on contemporaneous logic rather than as-built outcomes.

Ultimately, the refined application of retrospective TIA offers a methodologically sound and contractually credible framework for delay analysis, supporting fair and transparent dispute resolution consistent with the D&D Protocol’s intent.

Introduction

Among the various techniques used for analyzing construction delays, four methods are widely used: Impacted As-Planned, TIA, As-Planned vs As-Built (“APAB”), and Collapsed As-Built. Each method has its unique strengths and weaknesses. The Impacted As-Planned method's advantage is its simplicity and ease of implementation early in a project. However, it is often criticized for not reflecting actual project progress, which can reduce its credibility in disputes. TIA is highly regarded for its structured and logical approach that evaluates delay impacts prospectively at each Data Date[1]. APAB method offers a high-level comparison between planned and actual timelines, making it useful for identifying overall delay periods. Yet, it lacks the precision needed to establish causation between events and delays. Collapsed As-Built method can be effective in identifying what would have happened without specific delay events, but it is often criticized for being overly theoretical and heavily reliant on assumptions that may not be contractually or factually defensible.

Of the delay analysis methods described above, Core Principle 4 of the Protocol outlines TIA method as a primary approach for assessing EOT entitlements. Among the various delay analysis methods, TIA is often regarded as one of the most precise and structured techniques, and notably, it is explicitly recommended by the D&D Protocol for the delay analysis.

However, as highlighted in Core Principle 11 as below, where an EOT application is submitted after the effect of a delay event has already passed - or after the works have been completed - the guidance provided under Core Principle 4, including the use of TIA, is no longer considered appropriate.

---

[1] Data Date refers to the reference point in time used when preparing a project schedule. For example, if the scheduler prepares an updated schedule on January 1st, the Data Date is set as January 1st.

> *"Where an EOT application is assessed after completion of the works, or significantly after the effect of an Employer Risk Event, then the prospective analysis of delay referred to in the guidance to Core Principle 4 may no longer be appropriate."*[2]

This presents a practical dilemma for practitioners. In reality, it is common for EOT claims to be prepared and submitted after the associated events or activities have almost completed at the final stage of the project. Yet under Core Principle 11, practitioners may be deemed unable to rely on TIA at this stage, despite it being the most logical and analytically sound methodology.

There are several reasons why EOT claims are often delayed until a later stage in the project lifecycle:

1) During the execution phase, parties frequently fail to reach agreement on the time impact of events as they occur.

2) EOT procedures are often initiated only as the project nears completion, particularly when it becomes clear that the contractual completion date cannot be achieved.

3) While the event or its related activities are still ongoing, it is typically difficult to determine the full duration of the impact with reasonable certainty.

Given this context, it becomes increasingly important to consider how TIA might be applied in a retrospective basis. Although originally designed for prospective use, adapting TIA for retrospective analysis could provide practitioners with a technically robust and contractually defensible means of identifying delay - particularly in cases where contemporaneous assessments were not feasible.

Ultimately, the objective of delay analysis is to identify the actual period of delay as accurately as possible. A retrospective TIA, if properly structured and transparently implemented, could serve this purpose effectively. In doing so, it would contribute significantly to reducing ambiguity and minimizing disputes between the contracting parties, thereby reinforcing the D&D Protocol's overarching aim of facilitating the timely and fair resolution of delay and disruption claims.

Weaknesses in As-Planned vs As-Built Method Approach

Legal professionals and courts often tend to consider APAB method as more objective and factually grounded than TIA approach. From this perspective, APAB is perceived as clearer, more transparent, and therefore more accurate and reasonable for assessing delay claims. Accepting this view could lead to the conclusion that retrospective application of TIA is unnecessary.

However, APAB method has inherent methodological limitations, particularly when applied to the dynamic and fragmented reality of actual project execution. It often fails to identify the evolving Critical Path ("CP") or to pinpoint the specific causes of delay with sufficient clarity or precision.

[2] Core Principle 11, D&D Protocol, page 32

This weakness undermines its reliability as a forensic delay analysis tool in complex projects. To illustrate these methodological constraints more clearly, a simple diagram is presented below.

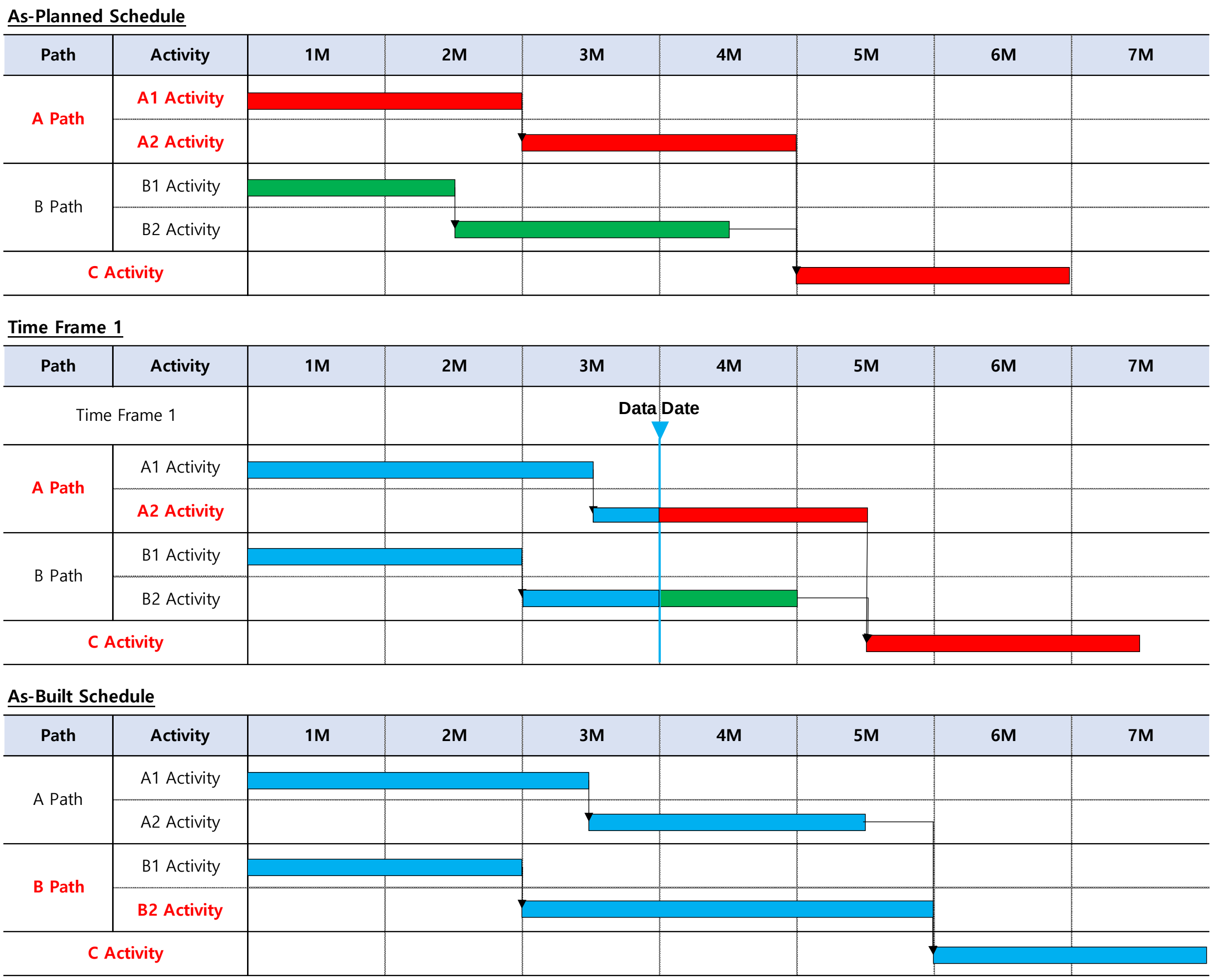


Figure 1 – Simple Diagram for Delay Analysis

Under the original schedule, Path A was designated as the CP. By Time Frame 1, approximately three months into the project, a 15-day delay occurred on Path A. However, by the time the project reached completion, it was Path B that experienced a 15-day delay, ultimately resulting in a one-month delay to the overall project completion. Including Time Frame 1 in the delay analysis enables a more accurate identification of delay responsibility throughout the project timeline. Specifically, it captures the 15-day delay on Path A and the 15-day delay on Path B, both of which contributed to the overall project delay.

However, under APAB approach, CP is identified solely based on the final as-built sequence - meaning Path B is considered as CP at completion. When comparing the planned and actual durations of Path B, the analysis may conclude that a one-month delay occurred on Activity B2.

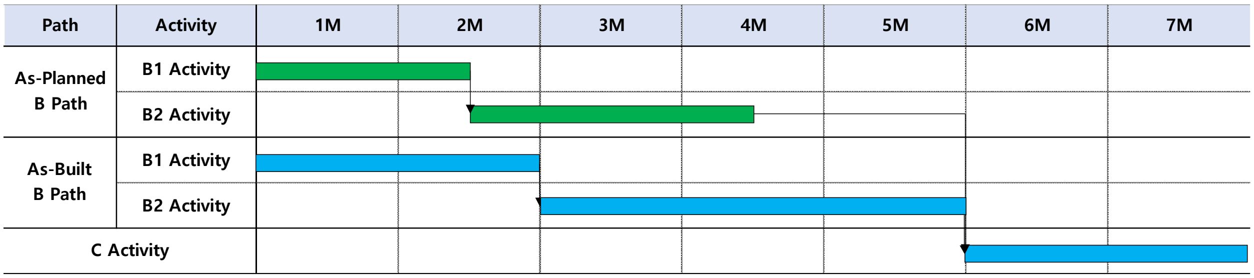


Figure 2 – APAB approach

This highlights a key shortcoming of APAB method: it bypasses the intermediate stages of project execution, such as delays that occurred earlier on Path A. As a result, the true sequence and causation of delay events may be misrepresented, and the full extent of delay responsibility may not be accurately captured. In omitting the dynamic progression of the project, APAB risks oversimplifying complex delay interactions and producing analytically flawed outcomes.

In most construction projects - particularly those lasting two years or more - CP is likely to shift over time, and significant events or issues often arise throughout the execution phase. In such cases, it becomes essential to analyze the project in segments to accurately identify both the causes and durations of delay. This underscores the necessity of adopting a TIA-based approach, which allows for a time-sliced assessment of delays at discrete stages of the project, based on contemporaneous data and planning logic.

It is important not to confuse this with Windows Analysis concept as described in the D&D Protocol, which - despite involving a breakdown of the timeline - differs fundamentally from TIA in both methodology and application. The Windows Analysis concept differs from TIA in two fundamental aspects. First, because it does not incorporate the use of fragnets[3], it lacks the ability to capture the project's exact status at a specific timeline. Second, in order to accurately determine the as-built critical path, a fundamental reconstruction of the logical sequence is required.

Given these distinctions, where detailed forensic analysis of delay causation is required - especially in long-duration and complex projects - TIA should be prioritized as the primary method for delay analysis.

Challenges in applying TIA method retrospectively

When TIA is applied from a retrospective basis, several methodological challenges can arise that may distort the accuracy of the delay assessment. One key issue relates to the misalignment between the timing of an event's occurrence and the timing of its resolution.

Consider the case of an Employer Risk Event that was originally identified within Time Frame 1 and was expected to be completed within that same period. However, in reality, the event extended through to Time Frame 4. If a retrospective TIA is performed, there is a tendency to model the

[3] A group of activities or durations, logically linked. In the Protocol it is to be used to illustrate the work flowing directly from an Employer Risk Event.

event using its actual completion in Time Frame 4. This results in the event's impact being assessed until Time Frame 4 based on its resolution, thereby inflating the delay attributed to that time frame[4]. Such distortion may obscure the effects of other intervening events or delays - such as those occurring in Time Frames 2 and 3 - ultimately misrepresenting the sequence and causation of delay impacts.

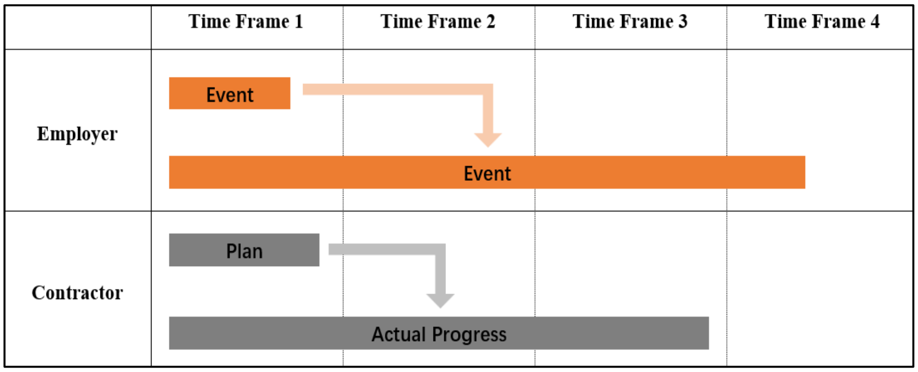


Figure 3 – Delayed Employer Risk Event and Actual Progress

A similar issue may arise in cases where a contractor's activity was originally planned within Time Frame 1 but was not actually completed until Time Frame 3. If the actual completion date in Time Frame 3 is retrospectively imposed during the analysis of Time Frames 1 and 2, the Contractor's delay could be overstated. Again, this may lead to a failure to recognize other Contractor's delay or Employer Risk Event that occurred in other time frames.

In both scenarios, retrospective application of TIA based on actual as-built information can result in the overstatement of delay impacts or Contractor's delay within earlier time frames. This undermines the time-sliced logic that TIA is built upon and may result in misleading conclusions regarding both entitlement and responsibility.

Therefore, when employing TIA in a retrospective basis, it is essential to implement technical safeguards that can mitigate these risks. This may involve isolating delay impacts by analyzing events and progress updates within each discrete time frame - before projecting actual outcomes - thereby preserving the integrity of the original planning logic and minimizing analytical distortion. Without such refinements, retrospective TIA risks attributing delay inaccurately and may inadvertently obscure the impacts of delay events.

Methodological enhancement

In light of the aforementioned issues, the retrospective application of the TIA method requires methodological refinements in the Risk Events, Progress, and Relationships are assessed and determined.

[4] Time frame in TIA refers to a discrete point in time - often aligned with a schedule update or project milestone - used as a basis for inserting a fragnet and assessing the potential impact of a delay event on the remaining project duration.

By adopting these adjustments, practitioners can achieve a more precise delay analysis, thereby enhancing the reliability of TIA when is used retrospectively. With such enhancements, TIA can remain a valuable and defensible tool even in post-event or as-built contexts.

1. Risk Events

When applying the TIA method from a retrospective basis, Events should be modeled as Fragnets with a clear distinction between two types as below:

1) Delayed Action
2) Significant Change (referring to a significant deviation in scope or execution)

1) Delayed Action

The first type, Delayed Action, typically involves Employer-caused delays such as interference, delayed decision-making, or late issuance of instructions. In these cases, at the time the Event first occurred in Time Frame 1, it would not have been foreseeable that the impact would extend as far as Time Frame 3. Accordingly, the initial delay analysis should be conducted based on the estimated completion period as understood within Time Frame 1.

In the subsequent Time Frame 2, the delay analysis should be updated to reflect a revised forecast, but still constrained within what would reasonably have been anticipated at that stage - i.e., within Time Frame 2 that does not yet assume the delay will continue into Time Frame 3. The analysis here is not subject to any artificial limit such as “not exceeding the window,” as would be the case in a Window Analysis. TIA is a fundamentally different methodology compared to the Window Analysis method and does not inherently impose such time-slicing conditions.

It is only upon reaching Time Frame 3 that the actual completion date of the Event becomes known. At this point, the full and final impact period of the Event can be determined with certainty. This phased approach allows the impact of the Event to be recalculated in each Time Frame based on the knowledge reasonably available at the time.

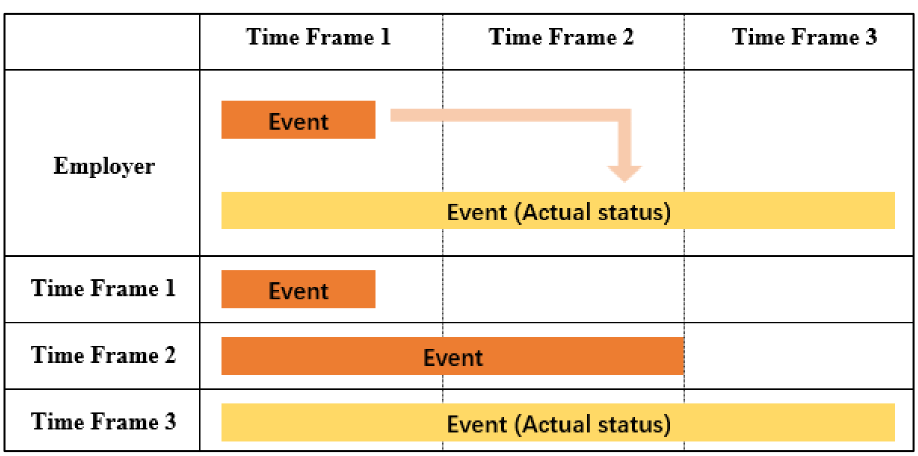


Figure 4 – Delayed Action during Time Frame

Through this progressive modeling of the Event's Fragnet across successive Time Frames, the analysis can distinguish between the Employer's delay and other Events or Contractor's delays that may emerge in different time frame. This structured breakdown enhances both the technical accuracy and the forensic defensibility of the retrospective TIA.

2) Significant Changes

The previously discussed 'Delayed Action' represents a form of delay that results purely from procedural or operational postponements. Because it is a linear and time-bound occurrence, the delay period should be assessed separately within each Time Frame. This aligns with the core principle of TIA, which requires that delay impacts be evaluated based on what could reasonably have been anticipated at the time of the analysis. In other words, within Time Frame 1, it would not have been foreseeable that the delay would extend as far as Time Frame 3. Therefore, the delay analysis at that stage should only account for the anticipated impact within the boundaries of Time Frame 1.

The same principle should apply to 'Significant Changes', even though its nature may be more complex. For instance, if in Time Frame 1, the Employer issues an instruction to change the structural system from reinforced concrete to steel structure, such a change would clearly constitute a substantial shift in scope. In this case, it may have been reasonably foreseeable from the outset that the impact of this change would extend into Time Frame 2. Therefore, when analyzing the delay impact in Time Frame 1, it would be appropriate to include the full anticipated effect - even if it spans beyond Time Frame 1 - since the prolonged impact was already predictable at that point.

In summary, while 'Delayed Actions' require step-by-step recalculation of delay periods across successive Time Frames due to their unfolding nature, 'Significant Changes' may justify broader consideration of future impacts beyond the initial Time Frame, provided those impacts were reasonably foreseeable.

One of the fundamental methodological distinctions between Window Analysis and TIA lies in how delay periods are measured and allocated across the timeline of the project. In Window Analysis, delay impacts are strictly confined to the defined window periods. This means that any delay must be assessed only within the boundaries of the current window. If the delay period is calculated beyond the designated window, it may result in distortions in the cumulative delay measurement. Specifically, the total delay calculated across all individual windows must equal the overall project delay. However, if a delay spills over into subsequent windows and is not properly isolated, it can lead to an inflated and logically inconsistent outcome where the sum of the window-specific delays exceeds the actual total delay on the project.

In contrast, TIA calculates the net effect of delay events introduced at each Time Frame by isolating the delay impact within that frame while excluding delays already accounted for in previous Time Frame. As such, there is no methodological requirement in TIA to confine the delay impact strictly within the limits of a predefined Time Frame. Instead, the analysis is based on inserting a fragnet at the relevant data date and projecting its impact over the remaining duration of the project.

Moreover, Window Analysis inherently relies on a breakdown of the project schedule into discrete, independent windows that are analyzed separately. TIA, on the other hand, takes a forward-looking approach from each data date, evaluating how an event would have affected the remaining works based on the plan at that point in time. Consequently, the concept of an "analysis period" in TIA is fundamentally different from that used in Window Analysis as shown in the diagram below.

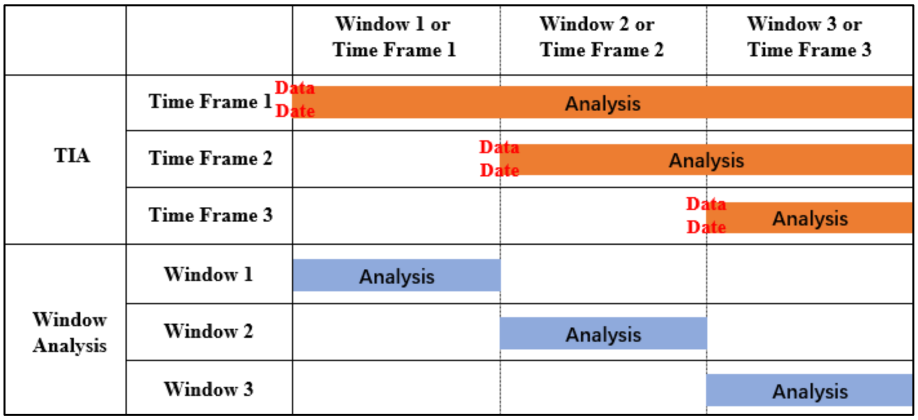


Figure 5 – Difference between TIA and Windows Analysis

This distinction is crucial when considering the appropriate method for analyzing complex delay scenarios, particularly when events have cascading effects or when the analysis must distinguish between overlapping or sequential delays.

The impact of a 'Significant Changes' can generally be categorized into two scenarios for delay analysis. The first scenario is where the originally anticipated impact of the event becomes more severe or extended in a subsequent Time Frame.

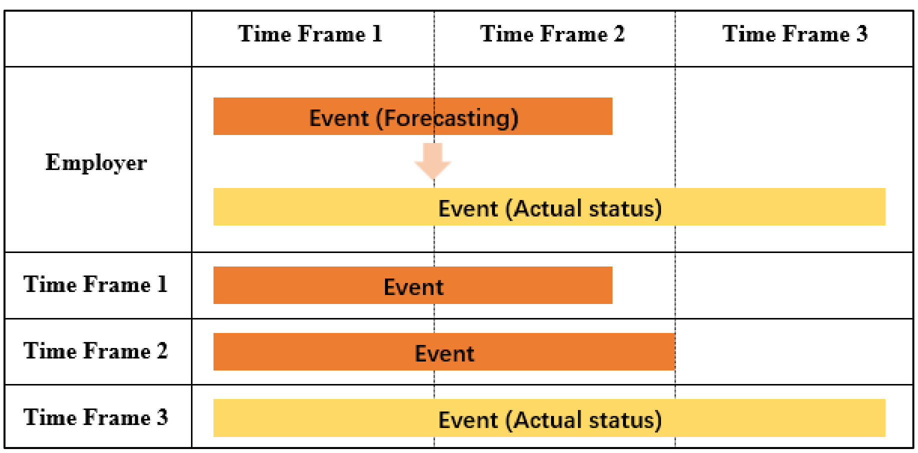


Figure 6 – Delayed Significant Changes

In such cases, the delay impact should initially be assessed within Time Frame 1 based on what was reasonably foreseen at the time. If the analysis moves to Time Frame 2, the additional impact should be evaluated within that frame, and limited to what could reasonably have been anticipated at that updated stage. Although it may be possible to extend the projected impact into Time Frame

3 - provided there is contemporaneous evidence that such prolongation was anticipated at the Time Frame 2 stage - in retrospective analyses, it is often difficult to find such evidence. Therefore, attributing an extended impact beyond the originally anticipated duration without adequate justification in Time Frame 2 may lead to overstated delays or create evidentiary challenges.

Only in Time Frame 3, once actual progress and outcomes are available, should the final impact period of the Event be determined based on factual records. At this stage, it is critical to distinguish between the impact that was originally expected and the impact that was ultimately realized. More importantly, the analyst must identify the reason for any discrepancy between the two. If the extended delay is attributable to the Contractor - for example, due to slow execution or inefficient resource deployment - then any additional delay occurring in Time Frames 2 and 3 should not be counted as Employer's delay. In such cases, the delay must be appropriately apportioned, and the Contractor's contribution to the prolonged impact period must be excluded from the Employer-responsible delay.

The second scenario involves cases where the actual impact period of an event turns out to be shorter than what was originally forecasted.

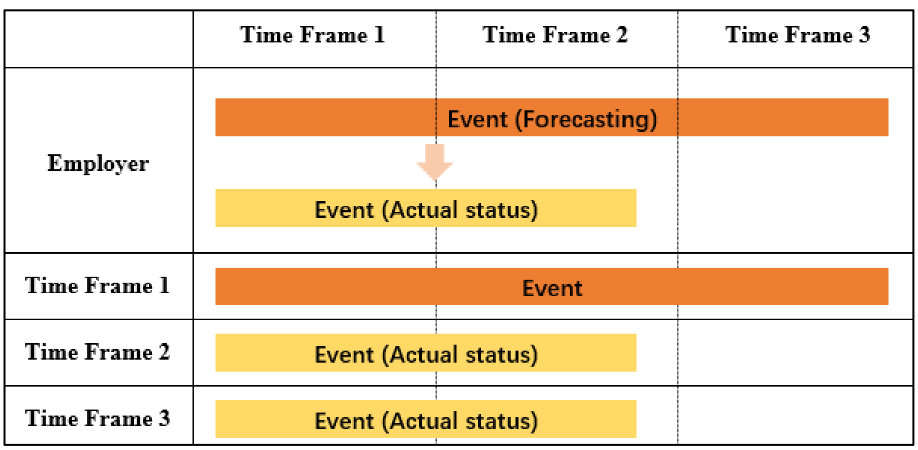


Figure 7 – Shortened Event

In such cases, during Time Frame 1, the delay analysis may reflect the originally anticipated impact duration as the basis for the assessment. However, once the Event completes in Time Frame 2, the impact duration must be adjusted accordingly to reflect the actual completion date of the Event. If the Event have been completed in Time Frame 2, it is reasonable that there would be little to no residual delay attributable to the Event in Time Frame 3.

In this context, it becomes critically important to determine why the impact period was shorter than initially anticipated. If the reduction in impact duration resulted from the Employer's actions - such as expedited approvals or early provision of access - then the Employer's overall responsibility for the Event should be reduced accordingly, and only the shortened impact period should be attributed as Employer's delay.

Conversely, if the Contractor was responsible for shortening the impact period - through acceleration measures, re-sequencing, or other forms of mitigation - then the originally anticipated delay period remains attributable to the Employer, and the reduced portion should be recognized as a Contractor-driven acceleration or mitigation. In this case, the acceleration effort should be recorded separately and not deducted from the Employer's delay liability, although it may form the basis of a cost claim by the Contractor.

This distinction is essential to ensure that the final calculation of delay responsibility accurately reflects the underlying cause of changes in the impact duration.

2. Progress

In the TIA method, the Contractor's progress is input into the schedule based on the Data Date of each Time Frame. This allows the analyst to identify Contractor's delays or acceleration/mitigation efforts within each discrete period.

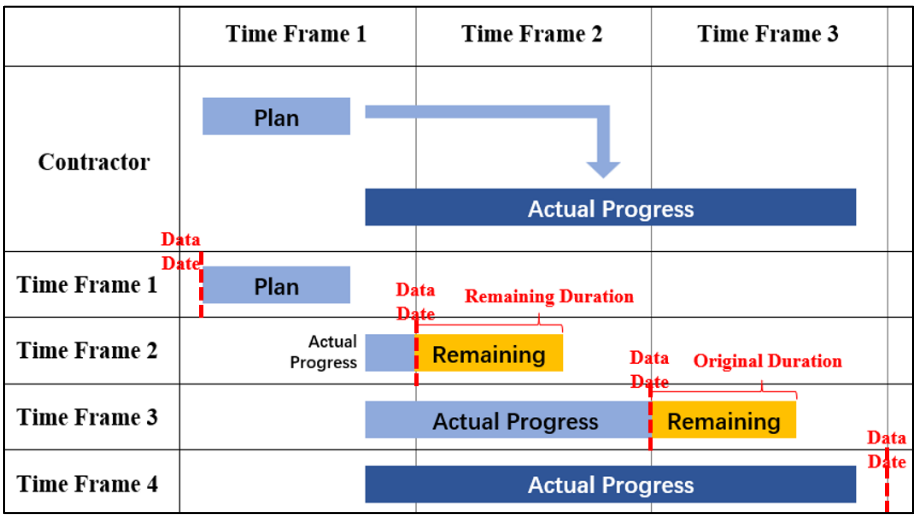


Figure 8 - Delayed Actual Progress

As illustrated in the figure above, when planned activities are significantly delayed in execution, it is important to assess how progress and remaining duration are entered across Time Frames.

1) Time Frame 1

Data Date is positioned at the beginning of the Time Frame 1. Therefore, no actual progress can be entered at this stage, as no work has yet been performed. In scheduling logic, the portion of the programme to the left side of Data Date represents the past, where actual performance (progress) is recorded. The portion to the right side of Data Date represents the future, where the remaining duration and forecasted activity logic are displayed.

2) Time Frame 2

To ensure reliable delay analysis, progress in Time Frame 2 must be input with due precision. The most critical consideration is not the actual completion date of the activity, but rather what the anticipated completion date was at the point in time represented by Data Date of Time Frame 2.

As noted earlier, simply inputting the actual completion date of an activity can lead to distortion in the analysis. This may result in overstated Contractor's delays or obscure the presence of other delay events or overlapping responsibilities that should have been identified within that Time Frame.

If a properly updated programme is available as of Time Frame 2, the appropriate Remaining Duration should be taken directly from that updated programme and entered accordingly. However, in the absence of such a contemporaneous updated programme, the Remaining Duration should be estimated based on the following principles:
If the Period A including actual progress is shorter than the activity's Original Duration, then the Remaining Duration in Period B should be calculated so that the sum of A and B equals the Original Duration of the activity. This is because, if the activity had already commenced before Time Frame 2, it would have been reasonable at that point to assume that it would be completed in line with its originally planned duration

(Remaining Duration B = Original Duration − Actual Progress A)

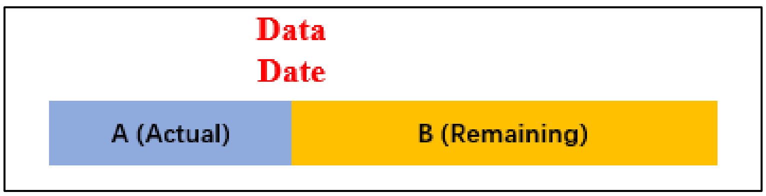


Figure 9 – Remaining Duration in Time Frame 2

If the Period A including actual progress already exceeds the activity's Original Duration, then the Remaining Duration in Period B should be equal to the Original Duration. This is because, if an activity that started prior to Time Frame 2 has already exceeded its originally planned duration as of the Data Date, it would no longer be appropriate to calculate the Remaining Duration based on the Original Duration. In such cases, if the scheduler knows that the activity has not been completed within Time Frame 2, and the Remaining Duration should default to the maximum limit - that is, the Original Duration.

A key principle here is that the Remaining Duration should not exceed the Original Duration. The Original Duration represents the planned execution period as approved in the Contractor's baseline programme. It is a contractual benchmark agreed upon between the Contractor and the Employer, and should not be unilaterally modified by the Contractor without formal review or consent.

If, at the Data Date, there is a clear indication that a certain activity - such as the procurement of long-lead item - is likely to be completed beyond its Original Duration due to excessive delay, the appropriate course of action is not to extend the Remaining Duration beyond the agreed original duration. Instead, the delay should be modeled separately as a Contractor Risk Event by inserting a fragnet.

These rules ensure that the analysis in Time Frame 2 is based on a realistic and consistent projection of progress at the time, rather than being influenced by hindsight. This approach preserves the integrity of the TIA methodology and avoids overstating or misallocating responsibility for delay.

3) Time Frame 3

When inputting progress in Time Frame 3, the actual completion date of the activity must be taken into account when determining the Remaining Duration. If the Remaining Duration for Period B is initially set to the Original Duration, and the forecasted finish date of activity falls before the actual completion date, then the entered Remaining Duration may be retained without adjustment.

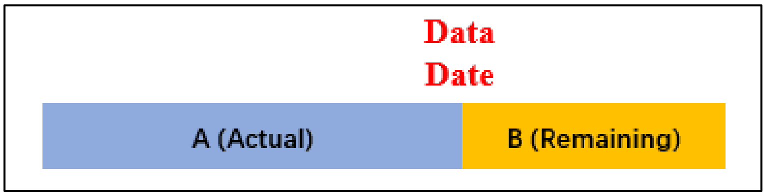


Figure 10 – Remaining Duration in Time Frame 3

However, if the forecasted finish date of activity based on the Original Duration extends beyond the actual completion date of the activity, the Remaining Duration must be appropriately shortened to align with the known actual completion date of the activity.

4) Time Frame 4

In Time Frame 4, progress can be finalized by recording the actual completion date of the activity as it was achieved on site. In the TIA method, accurate input of progress and remaining duration is critical to ensure the reliability and integrity of the delay analysis. Each Time Frame represents a snapshot in time, and the manner in which progress is entered directly influences the calculation of delay responsibilities and the identification of critical path shifts.

It is not sufficient to merely input the actual completion date of an activity retroactively. Instead, the analysis must reflect what was reasonably foreseeable at each Data Date. Therefore, depending on the timing and nature of the activity - whether it started before the current Time Frame, whether it was partially progressed, or whether it was completed - the progress update must be adapted accordingly. This approach ensures that Contractor delays, Employer risk events, and acceleration efforts are properly identified and apportioned, preserving the credibility of the TIA process.

3. Relationships

When applying TIA retrospectively, the actual status of the Impacted Activity is already known. Therefore, special attention must be given when defining the relationship (logic link) between the Event and the Impacted Activity.

1) Case 1

Firstly, if it is confirmed that the completion of the Event coincides with the start of the Impacted Activity, then the relationship between the two should be modeled as a Finish-to-Start (FS) link without lag[5] as shown in the diagram below.

[5] Lag in a network diagram is the minimum necessary lapse of time between the finish of one activity and the finish of another overlapping activity. It may also be described as the amount of time required between the start or finish of

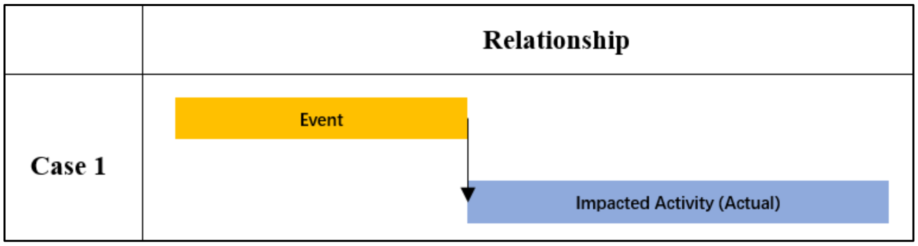


Figure 11 – Relationship in Case 1

2) Case 2

However, as illustrated in the diagram below, if there is a gap between the Event's completion and the start of the Impacted Activity, a Lag must not be added to the relationship in order to match the actual start date of the Impacted Activity.

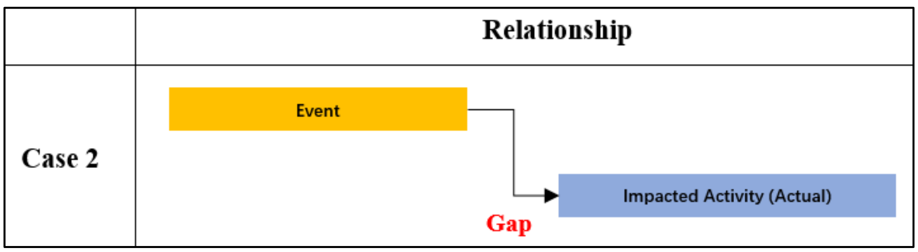


Figure 12 – Relationship in Case 2

If a lag is introduced to fill this gap and calculate the delay accordingly, the analysis may yield a distorted result. In such situations, the primary objective of the analysis is to quantify the delay attributable to the Employer risk event. However, the presence of a gap indicates that, although the Event had completed, the Contractor did not commence the subsequent activity as early as possible. This gap, therefore, may represent Contractor's delay.

If the gap period is included in the calculation of the Employer's delay, the analysis will fail to isolate the Employer-responsible delay period. For this reason, the relationship between the Event and the Impacted Activity should be modeled as a Finish-to-Start (FS) link without lag in this scenario.

3) Case 3

As illustrated in the diagram below, when the Event and the Impacted Activity overlap, careful consideration must be given to the selection of the logical relationship between them. If the Impacted Activity actually commenced before the Event was completed, it would be incorrect to establish a Finish-to-Start (FS) relationship between the two. The fact that the Impacted Activity started prior to the completion of the Event clearly indicates that FS logic does not apply in this case.

---

a predecessor task and the start or finish of a successor task.

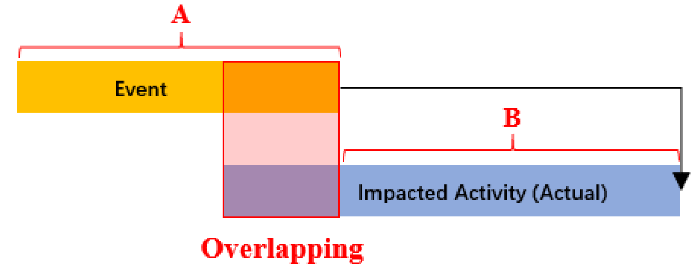
	Relationship
Case 3	

Figure 13 – Relationship in Case 3

In such situations, the appropriate approach is to model the relationship as Finish-to-Finish (FF) with lags. This reflects the reality that while the activities may run concurrently for some time, the completion of the Event still constrains the completion of the Impacted Activity. Using an FF link allows for a more accurate representation of the delay mechanism and ensures that the analysis captures the dependency correctly without misrepresenting the actual sequence of work.

In this scenario, where a Finish-to-Finish (FF) relationship is used, it is often necessary to apply a Lag. However, the Lag value (Period B) must be carefully determined based on the actual influence of the Event, and it should not exceed the input Event's period (Period A).

If the Lag is simply set based on the actual completion date of the Impacted Activity, without considering the true effect of the Event, it may lead to an inflated and unreasonable delay calculation. For example, if the Employer-responsible Event lasted for 15 days (Period A), but the Lag is arbitrarily set to 20 days (Period B), the analysis may incorrectly indicate that the Employer caused up to 20 days of delay. This would result in an unreasonable attribution of responsibility.

Put simply, in any delay analysis scenario, the calculated delay period should never exceed the maximum duration of the Event or the input value that defines its scope of impact. Therefore, the Lag used in an FF relationship must always reflect the delay effect attributable to the Event and remain within the boundary of the Event's accountable period. This is ultimately because the purpose of linking the Impacted Activity to the Event is to calculate the pure delay period attributable to the Event itself.[6]

Conclusion

TIA method, as recommended by Core Principle 4 of the D&D Protocol, is widely recognized as one of the most structured and reliable techniques for assessing EOT entitlements. While originally intended for prospective use during the course of project execution, the reality of construction practice often necessitates its application in a retrospective context - especially when EOT claims are prepared toward the end of the project or after the relevant delay events have completed.

[6] While the planned schedule of the Impacted Activity is indeed a relevant factor when establishing relationships, this section has focused specifically on the retrospective application of the TIA method.

However, as noted in Core Principle 11, the retrospective application of TIA poses significant challenges, particularly in aligning the methodology with the originally intended logic and forecasting assumptions. If delay impacts are measured solely based on actual completion dates, without regard to what was reasonably foreseeable at each Time Frame, the result may be a distorted attribution of delay responsibility. This is especially true when delay effects are extended or compressed across multiple Time Frames, or when Contractor performance (or lack thereof) introduces gaps or overlaps that misrepresent the true nature of Employer risk events. To minimize these challenges, methodological refinements are essential.

First, delay events should be modeled using fragnets, distinguishing between 'Delayed Actions' and 'Significant Changes'. For 'Delayed Actions', delay should be analyzed frame by frame, adjusting impact duration only as new information becomes available. For 'Significant Changes', a broader impact may be considered in earlier frames if reasonably foreseeable at that stage.

Second, progress and remaining duration must reflect what could reasonably have been anticipated at the Data Date - not merely the as-built outcome. Using improper Remaining Durations or relying too heavily on hindsight can lead to inflated Contractor's delays or conceal Employer's delays. In particular, Remaining Duration must never exceed the Original Duration unless formally agreed; if delays surpass this, a separate fragnet for Contractor Risk Event should be modeled instead.

Third, when defining relationships between Events and Impacted Activities, logic types must reflect the actual sequence and dependency observed or expected at the time - not just match actual completion dates.

The retrospective use of TIA, if carefully structured and technically refined, remains a defensible and powerful method for delay quantification. By preserving the logic of progressive analysis and ensuring objectivity in event modeling, progress input, and relationship definition, practitioners can mitigate the risks of hindsight bias and deliver delay assessments that are both forensically credible and contractually sound. This approach ultimately upholds the Protocol's fundamental aim: to resolve delay-related disputes fairly, transparently, and with a minimum of contention between the parties.

Jungjoo, Im is an arbitrator and expert in Korea Commercial Arbitration Board (KCAB). He is a Director of Society of Construction Law Korea and CEO of The TEAM Co. Ltd.