Legal Note

Knowns and Unknowns of Concurrent Delay

John Livengood, A.M.ASCE[1]

Abstract: Concurrent delay is an essential concept in forensic schedule analysis. Although experts (and courts) use similar definitions of concurrency, there is a wide disparity in how experts (and courts) apply that definition and measure days of concurrent delay. A common understanding of concurrency is: two delays occurring at the same time that are the legal responsibility of different parties, each of which, independent of the other, delay the completion of the project. In practice, experts find themselves in dispute over implementation, with some believing that two events must begin at the same time for concurrency to exist, whereas at the other extreme, some argue that events that do not overlap can still be concurrent. Thus, courts faced with conflicting expert testimony, coupled with reliance on previous confused and obscure decisions, have difficulty providing clear guidance for the experts, courts, or other triers-of-fact. This article will review the three primary legal theories on concurrency as well as the various technical issues, analyze guidance from publications by ASCE, the Association for the Advancement of Cost Engineering International, and the United Kingdom's Society of Construction Law, and discuss best practices for analysis of concurrency. **DOI: 10.1061/(ASCE)LA.1943-4170.0000224.** *© 2017 American Society of Civil Engineers.*

Difficulty of Concurrent Delay

Discussing the law as it concerns concurrency in the U.S. is difficult because there is little consistency in how courts have approached the issue: "While courts uniformly seem to agree upon the basic rules of concurrency, the uneven application of these rules to recurring fact patterns has given rise to inconsistent precedent and a lack of predictable guidance for parties seeking to avoid future disputes." (Brasco and Anzidei 2010).

This uncertainty of concurrent delay application is reflected in other commentators' observations, (Finke 1992) and in the courts themselves. One court observed that concurrency is "at best murky and confusing." (*Sterling Millwrights, Inc. v. U.S. 1992*). A recent case cogently summarized the current status of concurrency: "The exact definition of concurrent delay is not readily apparent from its use in contract law, although it is a term which has both temporal and causation aspects." (*George Sollitt Construction Co. v. U.S. 2005*). With this current uneven understanding of concurrency, the paragraphs below will address the definitional issues, the technical issues, and finally the legal standards used to evaluate concurrency.[1]

What Is Concurrent Delay?

The common law foundations for concurrent delay are predicated on the theory that a party should not benefit from a delay event for which it has responsibility. One commentator discussed this theory as follows: "a risk allocation principle that operates to distribute the costs associated with contemporaneous delays on a status quo basis; i.e., each responsible party bears its own costs." (Bruner and O'Connor 2016). In the United Kingdom, the concept is sometimes described as the prevention principle. The theory is that if an event occurs for which the owner is legally responsible, then the contractor is entitled to a time extension for that delay. Any alleged concurrent contractor delay will not prevent the proper application of the contractor's deserved time extension—the coincidental occurrence of a contractor delay should not impinge on this fundamental contract obligation. (Marrin 2013). Essentially, the United Kingdom sees the underlying principle of the time extension to be separate from the concept of cost recovery. While not so clearly articulated, U.S. courts follow this same legal thinking, as explained in the following decision:

> Concurrent delays affect the same 'delay period.' In cases of concurrent delay, where both parties contributed significantly to the delay period by separate and distinct actions, justice requires that the cost of the delay be allocated between the two parties proportionally . . . A concurrent delay is also independently sufficient to cause the delay days attributed to that source of delay . . . [A] concurrent action would have independently generated the delay during the same time period even if it does not predominate over the Government's action as the cause of the delay" (citations omitted). (*George Sollitt Construction Co. v. U.S 2005*).

Common formulations of the definition of concurrent delay include: "Delay to the project critical path caused concurrently by multiple events not exclusively within the control of one party" (Bruner and O'Connor 2016) and "[C]oncurrent delay can be described as a situation where two or more critical delays are occurring at the same time during all or a portion of the delay time frame in which the delays are occurring" (*George Sollitt Construction Co. v. U.S 2005*).

It is blackletter law that if delays are found to be concurrent, then the contractor gets a time extension for the period of concurrency but no delay damages, and the owner is unable to assess liquidated or actual damages. (*Utley-James, Inc. 1984; George Sollitt Construction Co. v. U.S. 2005*).

Concurrent Delay Guidance in Expert Guides

There are three Institutional, peer-reviewed expert guides to forensic delay analysis extant in the world today, each of which addresses concurrent delay. The three peer-reviewed guides[2] are:

[1]Managing Director, Global Construction Practice, Navigant Consulting; President, AACE International, Inc. One Market St., Spear Street Tower, Suite 1200, San Francisco, CA 94105. E-mail: John.livengood@navigant.com

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(1) ASCE Standard Guidelines for Schedule Delay Analysis (ASCE 2016), (2) Association for the Advancement of Cost Engineering International (AACE) Recommended Practice on Schedule Delay—RP 29R-03 (AACE RP 2011), and (3) the Society of Construction Law's Delay and Disruption Protocol (SCL-DDP 2017).[3]

The most recent and soon to be published in final form is "ASCE Guide to Schedule Delay," (ASCE 2016) that defines concurrency as follows: "Concurrent delay can be described as a situation where two or more critical delays are occurring at the same time during all or a portion of the delay time frame in which the delays are occurring" (ASCE 2016). This definition contains some common definitional elements, some important clarifications, and interestingly is missing one element commonly found when characterizing concurrency. In detail:

1. This definition says nothing about different parties—while concurrency as a theoretical construct can certainly exist with two simultaneous delays associated with the same party, one of the fundamental aspects of concurrency is that it is the legal theory to allocate responsibility (Bidgood 2008). As such, it is irrelevant unless there are two or more parties causing the delays in question. However, it is safe to assume that the ASCE Guide (2016) understood that the delays were the responsibility of two separate parties. In the text immediately following this definition, the example given discusses owner-caused and contractor-caused delays (ASCE 2016).
2. The definition requires the delays be at the same time. This precludes the thought sometimes promulgated that delays widely spaced in time, caused by two different parties can be concurrent (Livengood 2012). When there are two delays separated in time, but both occur after contractual completion, they are sometimes considered offsetting delays. Such delays are not truly concurrent according to this definition.
3. Further, the definition makes clear that delays need only overlap in time. This important concept allows delays that do not start on the same day to be concurrent (see discussion of literal concurrency below). One school of thought is if one delay starts before the other, that initial delay creates float in the entire critical path method (CPM) network and all subsequent delays cannot be concurrent (Ostrowski and Midgette 2006). If the delays start on the same day, it is sometimes called true concurrency (SCL-DDP 2017). This might be technically elegant, but it is not supported by case law.
4. One concept common to this definition and most others, is the idea of simultaneous critical path delays. This can easily happen when there are two critical paths during a particular period but becomes more problematic when there is only one.

AACE's Recommended Practice on Schedule Delay – RP29R-03 2011, offers two definitions of concurrency followed by some explanatory detail: (1) "Two or more delays that take place or overlap during the same period, either of which occurring alone would have affected the ultimate completion date; and (2) Concurrent delays occur when there are two or more independent causes of delay during the same time period." AACE RP 2011's detailed examination clarifies some of the definition by identifying five characteristics:

- Two or more delays that are unrelated and independent;
- Either delay would have delayed the project even if the other delay did not exist;
- Two or more delays that are the contractual responsibility of different parties, but one may be a force majeure event;
- The delay must be involuntary; and
- The delayed work must be substantial and not easily curable.

The AACE RP 2011, also discusses extensively the concept of simultaneity using the terms literal and functional concurrency: "Under the Literal Theory, the delays have to be literally concurrent in time, as in 'happening at the same time.' In contrast, under the Functional Theory, the delays need to be occurring within the same analysis period."

In the literal theory, if the delays do not start at the same time, they are not concurrent. Under this theory, the first delay to commence creates float in the entire network, so the subsequent delay is by definition not on the critical path and does not therefore delay the project completion (Ostrowski and Midgette 2006). Some commentators as well as the AACE RP 2011 have observed that exact simultaneity is impossible. But a more rational approach is to recognize that virtually all CPM schedules use a day as the smallest unit of time, so delays starting on the same day, regardless of what time in that day they started, are considered simultaneous (Livengood and Peters 2008).

Essentially, the AACE RP 2011 recognizes that as accurate a tool as a CPM schedule is, with its date-specific activity durations and detailed mathematical calculations, the measurement of the start or effect of a specific event often cannot be measured with sufficient precision to distinguish certain impact events.

In England, SCL-DDP 2002 issued a well-reasoned synopsis as follows: "True concurrent delay is the occurrence of two or more delay events at the same time, one an Employer Risk Event, the other a Contractor Risk Event, and the effects of which are felt at the same time. True concurrent delay will be a rare occurrence."

This 2002 definition has been retained in the recently released second edition of the SCL-DDP 2017. However, the commentary and discussion of the definition has changed. The SCL-DDP 2017 recognized that: (1) if the effects of the delay are felt at the same time, then it might be considered concurrent, even if the delays occur at different times; (2) that the delay must delay completion; and (3) that CPM analysis is essential in determining concurrency. SCL-DDP 2017 also discusses the alternative concept that when one delay starts before the other, that first delay causes float in the second and thus there is no concurrency. SCL-DDP 2017 recognizes that while courts in the United Kingdom are divided on the subject, the preferred technical position is that there is no concurrency for delays that start on different days. (SCL-DDP 2017). Essentially, SCL-DDP 2017 has recommended literal concurrency as the preferred position on delay simultaneity.

The assumption that the delay is caused by two separate events is understood despite the absence of any discussion of the topic in either SCL-DDP 2017 or in John Marrin's (2013) authoritative commentary on SCL-DDP 2002.

The following sections discuss three major aspects of concurrency: the technical aspect of calculating concurrency analysis, the legal aspects of concurrency, and some other issues related to how to consider concurrent delay.

Technical Aspects of Concurrency

From a technical perspective, there are five interrelated questions that must be considered in association with defining concurrent delay:

1. Do both delays have to be on parallel critical paths or do they have to be on the same critical path?
2. Do the delays have to be literally at the same time or is it sufficient that they occur near in time to each other?
3. Can two delays, one being critical and the other near critical, be concurrent?
4. Can two delays widely separated in time be concurrent?
5. Do the alleged concurrent delays have to be measured at the end of the project?

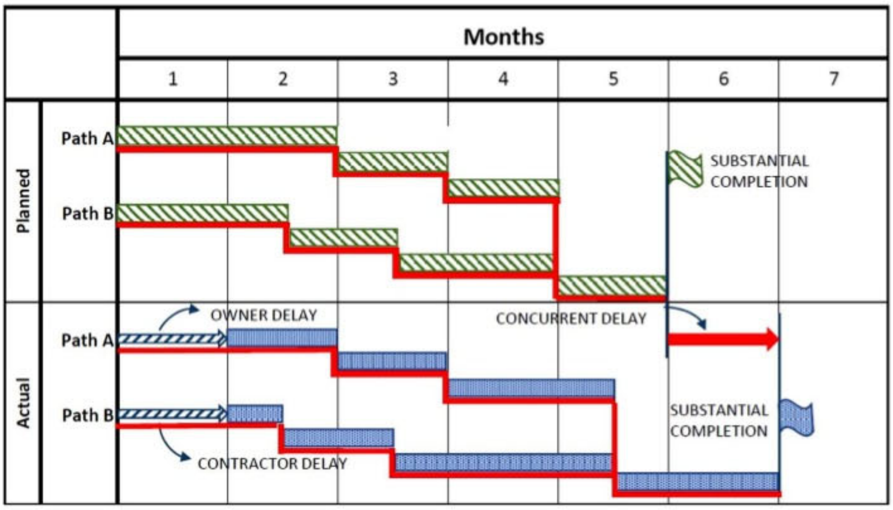

Fig. 1. Two critical paths

These five major technical issues are all interconnected and generate other subquestions in particular fact situations. In the following paragraphs, each of the three principle institutional technical guides, and how they each address these five issues, are discussed.

Same or Parallel Critical Paths?

The institutional schedule delay guides and expert commentaries (Bruner and O'Connor 2016; Wickwire et al. 2010; Pickavance 2005; Trauner et al. 2007; Burr 2016; Keane and Caletka 2015) say that the two (or more delays) that are considered concurrent must be on the critical path. This concept is most understandable if there are two parallel critical paths as illustrated in Fig. 1. CPM schedules often have parallel critical paths that reflect two or more different sequences of critical work. In the figure, the first critical path reflects an owner-caused delay due to the nonavailability of the project site. The second concurrent critical path concerns the contractor's ability to mobilize.

This example is the simple one and is often the classic case of dual–critical path concurrency. However, it is more complicated if the CPM schedule shows only one critical path associated with the delay period. There are two options in this case. First, the critical path depicted on the CPM may be overly simple. In other words, it depicts one ongoing activity sequence, when in fact there are two. For example, suppose the CPM's first activity is to mobilize to the site. This activity is clearly a contractor activity, so it is not surprising it is depicted on the CPM as the first activity with no parallel critical path. However, that contractor activity is actually dependent on an owner activity of making the site available. This is similar to the example discussed above, and the solution is that the overly simple CPM should be amended to reflect that there are actually two activity sequences here.

The second alternative is that there is only a single CPM activity, one activity for which there is joint responsibility. (Bruner and O'Connor 2016). Our legal system recognizes that there can be joint responsibility for a single event, and if that event fails to happen, the two responsible parties can both be liable. For example, if the contractor and the owner were to be jointly responsible for selecting a third-party commissioning agent, and both fail to do so, that is not a concurrent delay but rather joint liability between the parties and would be treated under typical contract or, if appropriate, tort liability.

Most definitions of concurrency require that the two delays be caused by separate events that are the responsibility of separate parties. It is recognized that there is a fine line between two separate critical paths leading to the same activity and joint liability. This is clearly fact-driven and must be evaluated in each instance. In all the subsequent discussion, it is assumed that there are two separate critical paths (or near-critical paths) rather than joint liability.

Literally at the Same Time or Near in Time

Because most CPM schedules do not have parallel critical paths for all or most of the project duration, it is important to address if delayed activities on the critical path can be concurrent with delays to activities on a near-critical path. The clearest explanation of this is AACE RP 2011's literal concurrency proposition: "Under the Literal Theory, the delays have to be literally concurrent in time, as in 'happening at the same time.'"

Under this proposition, if there is a single or dual CPM critical path, and a delay occurs on one of the paths, it creates float through the remainder of the CPM, and there can be no concurrency (Fig. 2). Support for this is reflected in a strict reading of the Federal contract clauses governing the basis for a time extension as discussed below:

> Based on today's [Federal] contract definitions for the justification of delay, it is unlikely for two delays to be considered concurrent unless they literally start on or about the same date. Once one delay has clearly extended the completion date, then an analysis of the second delay must consider the extended completion date when testing for concurrent delays. We have found no contract provision which would allow a "wait and see what happens" analysis to use future delays to offset earlier delays. On the contrary, contract change clauses demand real time settlement of contract impacts and specify the analysis required to show time entitlement (Ostrowski and Midgette 2006).

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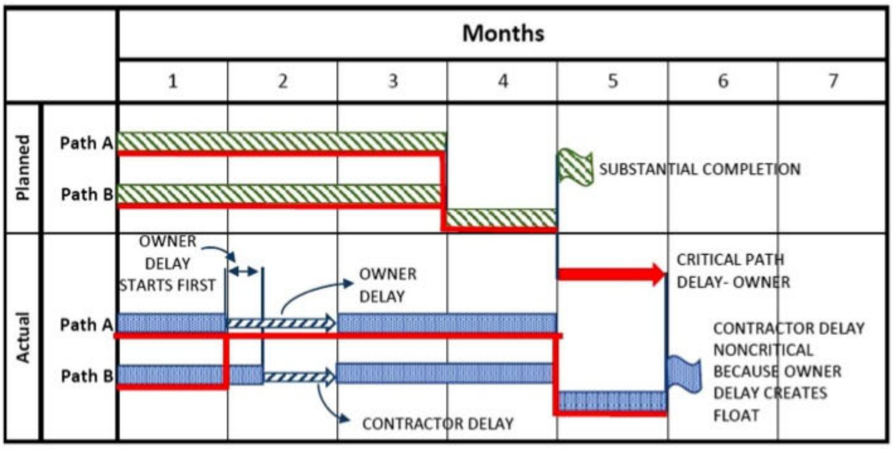

Fig. 2. Literal concurrency

SCL-DDP 2017 recent second edition has come to a similar conclusion. After discussing the prospect of a contractor delay starting first and an owner delay commencing a short time later, SCL-DDP 2017 opines:

> On the [second] view, the [Owner] Delay will not result in the works being completed later than would otherwise have been the case because the works were already going to be delayed by a greater period because of the Contractor Delay to Completion. Thus, the only effective cause of the Delay to Completion is the Contractor Risk Event.
>
> The Protocol recommends [this second] view, i.e., that where an EOT application relating to the situation referred to in [the example] is being assessed, the Employer Risk Event should be seen as not causing Delay to Completion (and therefore there is no concurrency). Concurrent delay only arises where the Employer Risk Event is shown to have caused Delay to Completion or, in other words, caused critical delay (i.e., it is on the longest path) to completion. The Protocol cautions that this recommendation would have to be re-considered were an appeal court to take a different approach to this issue.

U.S. courts or Boards have never addressed the issue of exact simultaneity of delays. However, they seem to have generally taken the view that modern CPM analysis techniques can distinguish critical from noncritical delays. Upon occasion, courts have addressed these concerns with oblique and not fully satisfying words: "The suggestion of two concurrent delays to the critical path flies in the face of the critical path concept. Logically there cannot be two concurrent delays on the critical path because there is but one critical path at any one point in time, running in sequence from one critical path to another . . ." (*Mega Construction Co. v. U.S 1993*).

While this quotation might seem to support the literal concurrency theory, it actually reflects a poor understanding of CPM (Callahan and Hohn 2011).[4] Most CPM commentators recognize that there can be multiple critical paths on a project, each completely valid (Woolf 2012).

This view of concurrency assumes that CPM schedules, as created or updated during construction, accurately represent the events and sequences on the project. This is not a reasonable assumption—as much as CPM experts might wish that the schedules are absolutely accurate, the general recognition both in courts and among many experts (Carson et al. 2014; Woolf 2012; O'Brien and Plotnick 2012) is that such schedules cannot be relied upon for this degree of accuracy. It is upon this basis that AACE RP 2011 offers the functional theory of concurrency (Fig. 3). While this aspect of the theory might be better used as a construction-management tool to permit owners and contractors resolve delays on a real-time ongoing basis, it also reflects the uncertainly of the CPM process. "[U]nder the Functional Theory, the delays need to be occurring within the same analysis period."

The advantages to functional theory are that: (1) it recognizes that schedules are imperfect both in their creation and updating; (2) forensic delay analysis is often done on a monthly basis; (3) concurrency should be considered as part of the overall forensic analysis; and (4) in complicated scheduling sequences and numerous activities proceeding together, it may be impossible to exactly define the specific activity or sequence controlling the critical path—rather a group of similar activities may all be controlling the critical path. This is illustrated in Fig. 3.

The ASCE Guide (ASCE 2016) also concludes that delays do not have to start on the same day to be concurrent: "Concurrent delays do not need to have the same start or finish date." This position comports with one of the two alternatives identified by the SCL-DDP 2017, as discussed above.

Further, both courts and expert commentators agree that due to the inherent uncertainty of schedule logic and updates, delay-causing activities that start only near in time can be concurrent: "Generally, critical delays that start within less than a week of each other can be considered concurrent, but this generalization is dependent on the accuracy of the schedule" (Dale and D'Onofrio 2015).

Critical and Near Critical

This is a trick question. Only delay on the critical path can delay completion, so by definition, and supported by the definitions of concurrency, no near-critical path delays can cause concurrency. However, this strict rule is not compatible with AACE RP

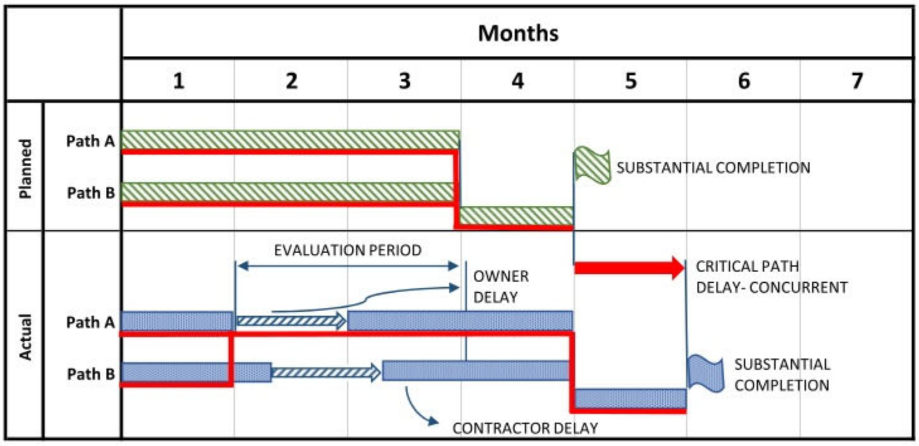

Fig. 3. Functional concurrency

2011's functional theory of concurrency, SCL-DDP 2017, first alternative for concurrency, or the general discussion in ASCE Guide (ASCE 2016). As discussed in the previous paragraphs, if the proposed critical path delays start on different days, one delay is almost invariably on a near-critical path, not the actual critical path.

Courts and commentators get around this problem by identifying that both of the proposed concurrent delays have an impact on the completion date in the absence of the other. For example, the first alternative identified in the SCL-DDP 2017, states: "On one view, the two events are both effective causes of Delay to Completion for the two-week period . . . because they each would have caused Delay to Completion in the absence of the other . . . " Similarly, the ASCE Guide (ASCE 2016) states: "8.1 Concurrent delays do not have to have the same start or finish date."

These delays are considered concurrent because they occur at the same time, or because they occur at different times but produce a common effect. As a result, the concept of concurrency can describe both the cause and the effect of multiple delay events. (Dale and D'Onofrio 2010).

Separated in Time

As we have seen in the preceding paragraphs, concurrent delays do not need to be perfectly simultaneous, nor both be on the critical path. But how far apart can they be? There are two related issues associated with this question. First is the issue of the cause and effect, since the cause of the delay is often separated in time from the effect. In this situation, the issue is not whether the delay manifests itself in a delay to completion, but rather is it the cause of the delay event or the effect of the delay event that creates the possible concurrency. Second, how far apart in time can either the cause or the effects be to be considered concurrent?

An example of the issue is evident in the common delay event of late delivery of equipment (Fig. 4). Is that delay to be considered at the time the manufacturing facility fails to produce the equipment on time, or is it when that equipment cannot be installed in accordance with its planned critical path installation? As with the first example identified in this paper, the issue sometimes turns on the completeness of the CPM schedule. Did that schedule include activities for ordering and manufacturing of the equipment or just its installation?

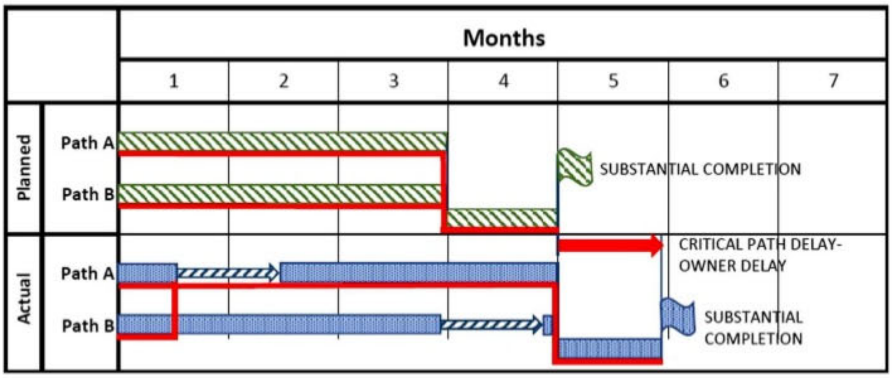

Fig. 4. Delays separated in time

The SCL-DDP 2017, seems to answer this question that the delay should be considered when it appears on the critical (or near-critical) path: "[A] common usage of the term 'concurrent delay' concerns the situation where two or more delay events arise at different times, but the effects of them are felt at the same time."

ASCE Guide (ASCE 2016) is silent on whether a delay in this situation commences when the initial delay occurs or when it is felt. However, the language of the entire ASCE Guide (ASCE 2016) seems to imply that the proper measure for the delay is when it is felt on the critical (or near-critical) path.

The AACE RP 2011 discusses this issue extensively and comes to the conclusion that the analysis needs to be consistent in how all delays are treated. If the analysis considers delay at the time of causation, then concurrency should be similarly calculated. If instead, the delay is considered only when it takes effect, then that should be the timing consideration. While the AACE RP 2011 presents both alternatives, the principal conclusion is that delays should be measured when they affect the schedule, not when they necessarily occur. This is similar to the forensic concept that there is no delay to an activity until the late-finish date has passed.

Thus, all three institutional guides conclude that the delay in question should be measured when it actually affects the critical path. Further, commentators have noted the courts' inability to clearly distinguish causal concurrency and time of occurrence. The difficulty of this issue as discussed in the expert guides, as well as the courts, is a testament of its technical and legal complexity: "[I]t must be noted that [courts and Boards] have the unfortunate tendency to use the term concurrent to describe both time-of-occurrence and true causal concurrency. Indeed, this mixed use of the term seems to have misled some [courts and Boards] into giving incorrect definitions of concurrency" (Finke 1992).

The second aspect of separated in time directly relies on AACE RP 2011's concept of functional concurrency. Recall this theory holds that two delays otherwise concurrent are only concurrent if they appear in the same time evaluation period, or window. This is not much of a problem if the time evaluation period is the typical period of a month, corresponding to the CPM update cycle. The theory here is that concurrency should be evaluated along with all other delay events. But what if the time evaluation period is longer? If it is two months, can they be concurrent? How about twelve months? This issue is made more complicated because some owners take the position that delays widely separated in time can be considered concurrent for purposes of a forensic analysis (Livengood 2012).

The best consideration is that the two delays should be close in time. Expert commentators have agreed that due to the inherent uncertainty of schedule logic and updates, delay-causing activities that start only near in time can be concurrent: "Generally, critical delays that start within less than a week of each other can be considered concurrent, but this generalization is dependent on the accuracy of the schedule" (Dale and D'Onofrio 2015).

It should be recognized that the selection of the time evaluation period of potential concurrent delay can have a significant impact on the determination of concurrency (Fig. 5). If the two alleged delays do not start on the same day (and there is no requirement that they do), they are only concurrent if the evaluation period captures both. If instead, the expert analyst places the delays in separate windows, they almost automatically cease to be concurrent (AACE RP 2011).

Distinguishing sequential from simultaneous delays has also been specifically addressed by U.S. courts. They seem to have come to the conclusion that CPM analysis can distinguish the two and that the delays should not be treated as anything but separate delays. In *R.P. Wallace, Inc. v. U.S. 2004*, the Court defined sequential delays as two or more different delays occurring over time, not necessarily connected or in exact sequence. The Court then proceeded to discuss the evolution of how sequential delays should be evaluated for purposes of assessing liquidated damages. The court opted for an approach that allocated responsibility for such delays. For those delays for which the contractor was responsible, the Government was entitled to assess liquidated damages. Conversely, though not specifically discussed in the case, the contractor would be entitled to delay damages for that period of time that could be allocated to the Government's responsibility.

The case of *Fischbach & Moore International Corp. 1971*, is often cited for the proposition that nonsimultaneous delays along

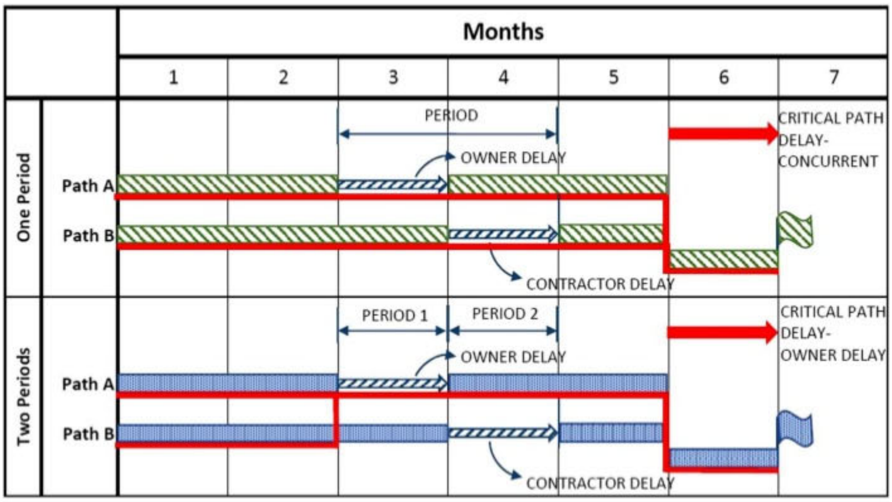

Fig. 5. Effect of time period selection

the critical path can create concurrency. Yet, on the matter before that court there was no late completion due to acceleration efforts by the prime contractor. Thus, the court was not being asked to consider the application of liquidated damages as is usual in concurrency cases. Instead, the court was only considering the amount of delay caused by the Government prior to the contractor's subsequent acceleration so that the contractor could recover delay damages. Nevertheless, the court concluded that sequential delays of the Government reduced the alleged concurrency stating:

> "With regard to the alleged intertwining of Government-caused and concurrent delays in this case, we have found, in the critical path analysis offered by appellant, a ready and reasonable basis for segregating the delays. If the delays can be segregated, responsibility therefor [sic] may be allocated to the parties.... As will be seen in the discussion that follows, we have no such difficulty in [segregating delays in] the present case." [Footnotes omitted].

Therefore, the court found that sequential delays, alleged to be concurrent and critical, were not and could be subject to apportionment.[5] In U.S. courts, the typical method of dispensing with the concept of nonsimultaneous delays is to look to the CPM delay analysis presented at trial.[6] For example, in *Tyger Construction Co. v. U.S. 1994*, the Board was able to dissect the events on the project and allocate delays as identified by the contractor's expert rather than use the method proposed by the Government's expert.

Does the Delay Have To Be Measured at the End of the Project?

U.S. law is clear that only delays along the critical path are eligible to be considered for concurrency. Specifically, they have to create a delay to the completion date. In *Santa Fe, Inc. 1984*, the Board found the concurrent delays claimed by the contractor were not on the critical path because they did not extend the completion of the project: "In terms of the concurrent delay rule, the concurrent delay must pertain to activities whose completion was critical to the completion of the project itself... Relief from the imposition of liquidated damages must depend upon showing concurrent delay in respect to activities on the critical path."

Commentators agree with the requirement that concurrent delays must fall on the critical path and delay completion of the project: "Concurrent delay is the delay to the critical path caused concurrently by multiple events not exclusively within the control of one party" (Bruner and O'Connor 2016). The AACE RP 2011 similarly says: "The concept of concurrent delay is based upon the premise that when multiple parties independently contribute to an impact to the critical path, the party or parties causing the event should be responsible for their share of that project critical path impact."

Recall, however, the discussion in the previous paragraphs that courts and experts have developed several slights of hand to get around this strict rule. There are a number of ways to get around the issue of all being on the critical path.

The first work around is that either of the delays would have delayed the project had the other not been present (AACE RP 2011). This is a fairly easy issue to establish. If you are using the native file format schedule files, an analyst need only zero out each of the alleged concurrent delays in succession. This is almost guaranteed to show that near-critical path logic sequences are concurrent or near critical. The second is to use the functional concurrency theory that allows delays during the same evaluation period to be considered concurrent. The third is for a court or expert to simply observe that there is sufficient uncertainty in any CPM such that delays that start close in time can be considered concurrent.

Three Different Legal Approaches to Concurrency

Courts often fail to recognize which of three different legal standards they are applying when deciding a case involving concurrent delay (Livengood 2015). In addition, they often seem to mix the descriptions of the different methodologies. The three approaches are:

- Intertwined delays;
- Apportionment of delays; and
- Jury verdict.[7]

Intertwined delays is the oldest concurrency theory, and one that is still applicable in cases where the facts do not allow the court or Board to distinguish concurrent from nonconcurrent delays. Courts have considered intertwined delays: "[W]e must apply the rule that there can be no recovery where the defendant's delay is concurrent or intertwined with other delays." (*Commerce Intern Co. v. U.S 1964*).

Such an approach is still used in a significant number of cases, even after another legal theory has been applied first. However, a significant majority of modern cases use the second approach—they apportion delays in concurrent delay cases (Dale and D'Onofrio 2015). While this term is not used consistently in court cases, the term apportionment applies to the process where the court looks at the detailed factual basis, particularly a CPM-based delay analysis and concludes that the events are not actually concurrent—they do not both fall on the critical path at the same time. (*Santa Fe, Inc. 1984; Williams Enterprises, Inc. v. Strait Manufacturing & Welding, Inc. 1990; Utley James, Inc. 1984; Tyger Construction Co. v, U.S. 1994*). This method often requires a detailed evaluation by the court—one that is aided by a careful CPM analysis presented by an expert: "With regard to the alleged intertwining of Government-caused and concurrent delays in this case, we have found, in the critical path analysis offered by appellant, a ready and reasonable basis for segregating the delays. If the delays can be segregated, responsibility therefor [sic] may be allocated to the parties." (*Fischbach & Moore Int'l Corp. 1971*).

The third approach has been called the jury verdict method (Livengood 2015). In this situation, the court or Board evaluates the relative merits of the two delays and applies its judgment in dividing the overall delay to the respective parties. The term apportionment is sometimes used in cases to allocate the delays based on the significance of each of the concurrent events on the project as a whole. Yet, this use of the jury verdict is not preferred, and is often directly contradicted by a process that parses the delays based on a fact-based CPM analysis allocation. (*Sauer Inc. v. Danzig 2000*). "[I]f there is no basis in the record on which to make a precise allocation of responsibility, an estimated ... may be made in the nature of a jury verdict..." (*Fischbach & Moore International Corp. 1971*).

Intertwined Delays

The original reluctance to parse the facts so as to untangle intertwined delays dates from the 19th century. The courts' reluctance to attempt to dissect the factual intricacies associated with concurrent delay, sometimes called "the rule against apportionment" (*Acme Process Equipment v. U.S. 1965*), continued into the 20th century: "[T]he court will not undertake to apportion responsibility for the delays." (*Greenfield Tap and Die Corporation v. U.S. 1929*). Even on the eve of the application of modern CPM analysis developed in the 1950s, many courts were following this hands-off attitude as expressed in *Commerce Intern Co. v. U.S. 1964:* "Plaintiff has not separated these delays from that charged the defendant, and, on this record the Commissioner has been unable to do so. Since … we cannot say he was wrong, we must apply the rule that there can be no recovery where the defendant's delay is concurrent or intertwined with other delays."

The Board undertook its own evaluation of the delays in *Coffey Construction Company 1993* because it found the expert's schedule analysis unreliable. Despite finding the contractor's delays on the critical path, while the Governments' were not, the Board found: "[The] delays to the project as a whole were inextricably intertwined and were caused jointly and concurrently by both parties. It is evident that substantial completion of the project as a whole could not have occurred without the completion of all three of those activities."

This line of cases is based on: (1) the absence of proof as to causation of the delay, (2) an inability to separate owner-caused delays from contractor-caused delays, and (3) a reluctance to speculate as to relative culpability and segregate the delays (*John Murphy Construction Co. 1979; Industrial Construction Corp. 1990*). Because of the greater sophistication of forensic schedule delay analysis in the past 25 years, this reasoning has generally given way to other, more modern approaches as discussed in the following paragraphs. However, this intertwined approach is still applicable where it is impossible to parse or apportion the concurrent delays (*Baldwin v. National Safe Depository Corp. 1985*).

Apportionment of Delays

Currently, the resolution of concurrent delay issues is primarily associated with an analytical approach based on CPM schedules (*Williams Enterprises, Inc. v. Strait Manufacturing & Welding, Inc. 1990; Utley James, Inc. 1984; Tyger Construction Co. v. U.S. 1994*). In recent years, most courts have found repeatedly that claims of concurrency, when examined in the harsh light of factual chronologies and detailed CPM analyses, do not show one single overall concurrent delay, but rather show critical and noncritical delays, as discussed in *Blackhawk Heating & Plumbing Co. 1975*: "Appellant cannot successfully urge, as it apparently seeks to do, that because critical Contractor caused delays … were concurrent with noncritical Government delays … the imposition of liquidated damages may be avoided. Relief from the imposition of liquidated damages must depend upon a showing concurrent delay in respect to the activities on the critical path."

This process is followed in almost all cases now, although some recent cases, such as *Commerce Intern Co. v. U.S. 1964*, continue to follow the intertwined delay approach when they have found a more nuanced segregation of responsibility impossible. Nevertheless, the courts have continued to struggle with the apparent inconsistencies among intertwined delays, apportionment, and jury verdicts. The best current explanation of this test is reflected in *George Sollitt Construction Co. v. U.S. 2005:*

> If the evidence shows that the contractor, along with the government, caused concurrent delay to the critical path of a project, the contractor must apportion the delays affecting the completion of the project to be able to recover delay damages. Because concurrent delays which do not affect the critical path of contract work do not delay project completion, an accurate critical path analysis is essential to the determination of whether concurrent delays have caused delay damages related to the delayed completion of a complex construction project. If government-caused delays did not interfere with the project's critical path, no costs related to delayed completion of the project are owed to the contractor. To recover for the delayed completion of the project, not only must plaintiff disentangle its delays from those allegedly caused by the government, but the delays must have affected activities on the critical path. [Citations omitted]

The court in this case seemed to recognize that delay sequences not being on the critical path (assumedly near critical) could still be concurrent. However, the thrust of the opinion is well within mainstream thinking on concurrent delay and the preference for allocating responsibility based on a detailed chronology and forensic schedule delay analysis (*Santa Fe, Inc. 1984; Williams Enterprises, Inc. v. Strait Manufacturing & Welding, Inc. 1990; Utley James, Inc. 1984; Tyger Construction Co. v. U.S. 1994*).

Jury Verdict Method of Delay Segregation

The jury verdict approach to concurrency allocates the delays based on the significance of each of the concurrent events on the project as a whole. The approach generally does not use a detailed chronology or schedule delay analysis in making such an allocation. This approach has two prerequisites. First, there must be two genuinely concurrent delays, ones that occur at the same time, and both must delay the completion of the project and are thus both on the critical path. In this situation, the detailed factual and CPM analysis, if they exist, cannot segregate the delays into separate responsibilities for the parties. Second, the court must find that there is some basis for parsing the delay and damages associated therewith based on the significance of each of the concurrent events on the project as a whole. There are relatively few cases addressing this position clearly. For example, in *PLC Construction Services, Inc. v. U.S. 2002* the court said:

> [The rule against jury verdicts] is an old one whose underlying policies do not remain in full force. One of the dominant reasons underlying it is the early judicial hostility to the use of privately agreed upon contractual remedies. … Today, given the complexity of contractual relationships, liquidated damage provisions have obtained firm judicial and legislative support. As long as the owner's own delay is not incurred in bad faith, it is not unjust to allow proportional fault to govern recovery. Generally, owners do not benefit from delays that they incur. Another reason cited in support of the rule is that proving [jury verdicts] is simply too difficult. We do not disagree with the difficulty of the task, but recovery should not be barred in every case by a rule of law that precludes examination of the evidence. [Citations Omitted]

In this case, the court concluded that there was sufficient information to allocate responsibility based on the factual evidence, and they did not resort to segregating the delays based on an estimated allocation.

The case of *Fischbach & Moore International Corp. 1971*, is also cited for the proposition that concurrent delays on the critical path, even if not able to be apportioned based on their factual basis and delay analysis, can be segregated in the manner of a jury verdict: "[I]f there is no basis in the record on which to make a precise allocation of responsibility, an estimated … may be made in the nature of a jury verdict … " However, the court was again able to allocate the delays based on its schedule analysis, and there was no need to resort to an estimated allocation. The dicta expressed in the court's opinion has found favor with commentators (Bramble and Callahan 2000; Wickwire et al. 2010). Thus, some modern courts recognize a jury verdict for responsibility, and thus delay, even when there is true concurrent delay that cannot be parsed based on the facts and delay analysis.

Yet the cases that actually render a decision on the jury verdict basis are extremely rare. In the case of *Raymond Constructors of Africa, Ltd v. U.S. 1969*, the court was unable to quantify the causation of three recognized impacts to the critical path: (1) the contractor's late procurement; (2) the owner's responsibility for the late local delivery of equipment; and (3) poor productivity by the contractor, even with the substandard equipment. As a result, the court made its own estimated segregation of responsibility:

> Actually, there is no basis in the record on which a precise allocation of responsibility for the overall delay in completing the work under the contract can be made as between the defendant's delay in procuring equipment… [the government's] delay in transporting equipment…to the job site, and the subcontractor's shortcomings. In such a situation, it seems that the only feasible thing to do is to make a finding in the nature of a jury verdict…

Cases like *Raymond* are rare, and most cases in the United States today decide delay in the cases of alleged concurrency using the allocation method, premised on the facts and a detailed forensic schedule delay analysis.

Other Issues in Concurrency law

There are at least five significant technical and legal issues that impact the calculation and finding of concurrency. First, pacing delays are a defense against the assertion of concurrency. Pacing delays are concurrent, but the reason they exist is because they are voluntary. Recall that one of AACE RP 2011's criteria was that the concurrent delay must be involuntary—when it is voluntary it is pacing:

> Pacing occurs when one of the independent delays is the result of a conscious, voluntary and contemporaneous decision to pace progress against the other delay. The quality that distinguishes pacing from concurrent delay is the fact that pacing is a conscious choice by the performing party to proceed at a slower rate of work with the knowledge of the other contemporaneous delay, while concurrent delays occur independently of each other without a conscious decision to slow the work.

Neither the ASCE Guide (ASCE 2016) nor the SCL-DDP 2017 discuss pacing. However, courts have found that pacing is a real and acceptable defense to the assertion of concurrency. For example, in the *Utley-James Inc. 1984*, the court stated: "[W]here the Government causes delays to the critical path, it is permissible for the contractor to relax its performance of its work to the extent it does not impact the project completion date."

Establishing proof of the voluntary nature of concurrency is always an issue. The best proof is contemporaneous statements by the pacing party that it is in fact slowing its work because of the other parties' underlying delay. After-the-fact proof of the voluntary nature of pacing is sometimes difficult for the trier of fact to believe. Some commentators have argued that there should be a contractual requirement that the party pacing its work notify the opposing party (Hoshino 2006; Hoshino et al. 2011).

The second issue concerns the burden of proof. It is well understood that U.S. courts have established that the contractor claiming a delay bears the responsibility of proving the extent of delays and relating the delays to specific actions by the Government (*Wilner v. U.S. 1994*). More significantly, the contractor also bears the burden of separating and apportioning delays (*T. Brown Constructors, Inc. v. Peña 1997; Sauer Inc. v. Danzig 2000; PCL Construction Services Inc. v. U.S. 2002*) and for determining the existence or nonexistence of concurrency (*William F. Klingensmith, Inc. v. U.S. 1984*). Thus, the standards of burden of proof as regard concurrency seem to deviate from the traditional policies of burden of proof. Under traditional burden-of-proof rules, the owner would have to establish concurrency after the contractor established a prima fascia case of delay.[8] The rationale seems to be that proving the absence of concurrency is essential to the contractor's proof of damages due to delay as stated in *T. Brown Constructors, Inc. v. Peña 1997:* "It is well established that in order to recover for alleged compensable delay a contractor must demonstrate that delay was caused by the Government and, with a reasonable degree of accuracy, the extent of such compensable delay."

The third issue relates to the degree of proof. U.S. courts seem to have a lower standard of proof for the quantum of delay than for the quantum of proof for money delay damages (Livengood 2015). This is a logical extension of the tradition of concurrent delay as applied in the United States. Thus, to establish entitlement to a time extension, the contractor need only prove that concurrent delays resulted in a specific delay to project completion. To recover delay damages, the contractor must also prove that the owner's delays were not on the critical path, that is, not concurrent. In *Utley-James, Inc. 1984*, the Board concluded that: "A delay for which the Government is responsible is excusable by definition, and it may also be compensable."[9]

The interaction of acceleration and concurrency is the fourth issue. There are cases and commentaries on how the rules of concurrency function when associated with constructive acceleration (Dale and Muldoon 2009; Dale and D'Onofrio 2010). In the case of *Hemphill Contracting Co. 1994*, the Board found "a contractor cannot recover acceleration costs [incurred subsequent to and] flowing from concurrent delay, unless the record supports clear apportionment of delay and expense attributable to each party." The case, however, did not apportion delay, largely because there was little or no evidence of a schedule delay analysis, so the court was left to guess the critical path—which it refused to do. As a result, the Board defaulted to the nonapportionment rule and found the Government and contractor delays concurrent. Essentially, this decision, and another concerning the interaction of concurrent delay and constructive acceleration (*R.J. Lanthier Co. 2004*) have left the analysis of concurrent delay untouched. Courts and Boards, if provided with sufficient data in the form of events and schedule delay analysis, will identify which delays were on the critical path, which delays were not, and award time and delay damages accordingly.

The fifth and last issue discussed here is the development of cost-based concurrency. There have been articles by commentators for cost-based allocation of concurrency, although whether that distribution would occur before or after a finding of true concurrency is unclear (Bidgood 2008; McGeehin and Kime 2007).

Conclusion

Commentators and courts seem to agree about most of the essential elements of concurrency:

1. The delays must be caused by separate parties and separate causal events;

2. The delays must be close in time, although they do not have to start or finish on the same day;
3. Either delay absent the other would have had to delay completion of the project—the delays either have to be on the critical path or be very near critical; and
4. The delays must be involuntary.

The U.S. courts seem willing to examine the allegedly concurrent events in detail and if possible, allocate the delays to the appropriate party, thus eliminating or diminishing the period of concurrency. U.S. courts sometimes state that such segregation is appropriate, but seldom actually do so. U.S. Courts find either no basis to allocate delay, allocate delay based on detailed factual and CPM analysis, or, being unable to allocate concurrent delays, instead choose to exercise their judgment and segregate the delay using a jury verdict. It thus appears that the deciding factor in U.S. law is the quality of the proof in the detailed factual analysis and supporting schedule delay analysis.

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Endnotes

[1]Many of the ideas expressed in this paper were first discussed in: Livengood (2015), "Comparison" and Livengood (2016), "World Tour."

[2]It could be argued that the Guild for Project Controls (UK) also has a guide to delay methodologies. This guide is based on AACE's 29R-03 and is therefore excluded.

[3]Society of Construction Law, "Delay and Disruption Protocol" was first published in October 2002. A 2nd edition was published in February 2017.

[4]Even the otherwise well-regarded case Utley James 1984 incorrectly says "[S]trictly speaking there can be but a single delay over a given period of time . . ."

[5]*See* also *Essex Electro Engineers v. Danzig 2000*, where the court was able to apportion alleged concurrent delays that occurred sequentially.

[6]While the quality of such presentations is beyond the scope of this discussion, this author believes that much of the seeming inconsistency in how U.S. courts consider concurrency flows from the technical schedule delay presentations made by experts.

[7]*See* extensive discussion of this issue in J. Wickwire 2010 @ 9.08[G2]; *See also* Bramble 2010 and Fink 1992.

[8]It is interesting to note that in the cases of concurrent delay, the contractor need not show he would have finished on time but for the Government's delays. *Utley James 1984*.

[9]Accord: Cline Construction Co. 1984; Titan Pacific Construction Corp. 1987; *See* also Wickwire 2010 @ 9.08[G], which states "Neither the contractor nor the owner must satisfy the same standard for the recovery of damages as the standard required to avoid the application of delay damages through the obtaining of time extensions. . . . With respect to the avoidance of delay damages either the contractor [or owner] need only show that the other party [or some excusable delay] was responsible for a concurrent critical path delay."

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