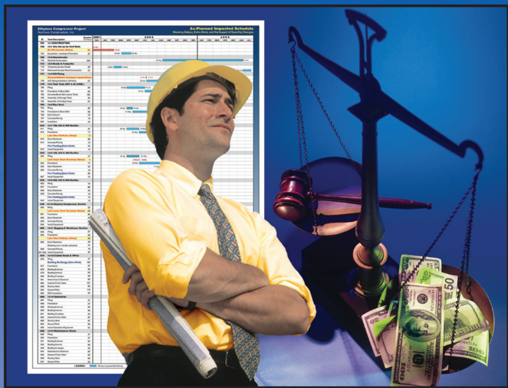

Contemporaneous Period Schedule Analysis Methodology

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LONG INTERNATIONAL

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1. INTRODUCTION

There are several industry accepted methodologies for forensic schedule analysis. Forensic schedule analyses generally can be classified into two types of methodologies: 1) observational and 2) modeled.[1] Observational techniques typically consist of using the contemporaneous schedules with only modifications for obvious and significant errors. Modeled techniques include the addition or subtraction of activities and or logic to model impact events.[2] The contemporaneous period analysis is a commonly used observational method for evaluating entitlement to a time extension and quantifying compensable delay.

The steps for performing a contemporaneous period analysis are summarized below:

- Become familiar with the project and relevant documents
- Perform a high level review of the available project schedules
- Select schedule windows
- Identify the critical and near-critical paths
- Perform a detailed review of the schedules selected for the analysis
- Determine the changes made between the schedules selected for the schedule windows
- Make copies of the analysis schedules and implement necessary corrections
- Develop variance tables to calculate date and duration variances
- Research activity impacts and allocate responsibility for delays
- Sum and document the results

Each of the above steps is further discussed in this article. Prior to performing a schedule analysis, however, the analyst should first consider several key factors to assess whether a contemporaneous period analysis is the most appropriate methodology for the unique project circumstances.

2. SELECTION OF A SCHEDULE ANALYSIS METHODOLOGY

When selecting a methodology, it is important for the analyst to consider several key factors. The first factor for consideration is the burden of proof. It is the responsibility of the party asserting the claim to demonstrate that it is entitled to an extension of time and/or compensable delay damages from the other party. If a contractor is requesting an extension of time and/or additional compensation, they are responsible for providing the proof of the delay, and it is not the responsibility of the owner to perform such an analysis to demonstrate that the contractor is or is

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1 AACE International's Recommended Practice 29R-03, Forensic Schedule Analysis, Figure 1, page 12.

2 For detailed information regarding Long International's modeled schedule delay analyses, see the article "Schedule and Delay Analysis Methodologies", which can be found on our website (www.long-intl.com).

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not entitled to a time extension or to time-related damages. While a modeled windows analysis may be appropriate for the contractor, an as-planned versus as-built or contemporaneous period analysis approach may be more appropriate for the owner.

It is also necessary to consider the purpose of the analysis. Several reasons for a forensic analysis include change order development, negotiated settlement, meditation, or arbitration. While a fully detailed modeled schedule analysis may not be necessary for change order development, it may be necessary in the event of arbitration or litigation.

The next factor for consideration is the complexity of the project and schedules. A large and complex project with multiple critical and near-critical paths may require a modeled approach, where a more simplified approach may not be sufficient in the event of multiple concurrent delays.

Another important factor is the length of the period being analyzed. If the analysis period is short, a modeled windows approach may not be necessary to identify the delays and responsibility.

It is also essential to consider the availability and quality of the project schedules. The analyst must consider (but not necessarily use) each available schedule update. Additionally, the quality of the schedules must be evaluated at a high level to determine the usability of the schedules and if, and to what extent, corrections are required.

The final consideration, and one that encompasses each of the above factors, is the time and budget available for the analysis. A detailed modeled analysis may be time consuming and, therefore, expensive to develop. If a schedule analysis must be completed quickly and or budget is limited, a detailed approach is most likely not an option. However, if the analyst is representing the party asserting the claim, discussions should take place with the client to determine the best approach given the time and available resources.

Based on the above factors, if a type of as-planned versus as-built analysis is warranted, Long International may utilize an observational, windows-based methodology to analyze the impacts and delays that occurred during the project. This is often referred to as a contemporaneous period analysis. This methodology is a retrospective analysis that uses the project schedule updates to quantify the slippage to a logic path that was critical or became critical during a select period of time. Long International's analysis is consistent with the AACE International Recommended Practice 29R-03, Method Implementation Protocol 3.3.

The analyst must understand that each project and schedule analysis is unique and has its own set of facts, circumstances, obstacles, and challenges. Each of the factors in this Section should be considered prior to making a choice on the selection of the schedule analysis methodology.

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3. BECOME FAMILIAR WITH THE PROJECT AND RELEVANT DOCUMENTS

Prior to performing any analysis, several important steps must be completed. A review of the contract is vital. The analyst must understand the contract documents and note any contract provisions pertaining to a claim situation. It is also important to understand the contract completion dates and if the contract requires any interim completion milestones prior to overall project completion.

Additionally, change orders must be evaluated such that the analyst understands how the contract has been modified and if any time extensions have been executed as part of any change orders.

During this step of the analysis, Long International becomes familiar with the contract scope of work, parties to the contract, and obtains a high level understanding of the overall project and associated issues causing the dispute.

4. PERFORM A HIGH LEVEL REVIEW OF THE AVAILABLE PROJECT SCHEDULES

This is a necessary step to determine the availability and content of the contractor's schedule updates. If a schedule analysis is to be performed, the schedules must be available in electronic schedule format. If these files are not available, direction from the client will be necessary on how to proceed. Assuming that electronic schedules have been provided, the analyst should review each schedule file to determine the data dates of the schedules and to determine the frequency of the schedule updates. Typically, contractors are required to provide monthly schedule updates, but additional updates may be available that model certain impacts or "what-if" scenarios completed by the contractor. Additionally, a prudent contractor on a large and or difficult project may elect to update the schedules more than once a month, or they may update a schedule in conjunction with a large impact or change order. Regardless, it is important to understand the available schedules and what data the analyst has to work with.[3]

In conjunction with the review of the available schedules, it may also be helpful to track the number of activities and relationships in each available schedule file. As part of the detailed review of the schedules, which will be discussed below, it is important to understand the changes that occur between each of the contractor's schedule updates. A preliminary inventory of available schedules and their associated activity and relationship counts may prove useful later in the analysis.

[3] The AACE International Recommended Practice 29R-03 advises that all of the available schedule updates do not need to be used, but all should be considered. See Section 3.3.E.4 of the methodology.

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After the initial review of all of the available schedule files, several schedules should be selected for a more thorough review and metrics analysis to obtain a general understanding of the quality and content of the schedules. During this review, the analyst should obtain a general understanding of the contractor's schedules. Items to review and note include:

- Activity ID structure – determine if the activities are set up such that pertinent activity data can be obtained by looking at the Activity ID
- Level of detail in activity names
- Existence and quality of a work breakdown structure and/or activity coding
- Open-ended activities
- Number and types of activity constraints
- Calendars used and the types of activities assigned to each calendar
- Cost and resource loading assignments

Another important part of this step is to determine which schedule activity will be used to track the completion of the project. Depending on the type of project, this activity may be Mechanical Completion or Substantial Completion. This activity will be used in the delay analysis to quantify delay in each schedule window. A review of the contract documents may indicate that more than one milestone needs to be tracked.

It is important to for the analyst to understand that poor schedules will most likely result in a poor analysis. It may be determined that many corrections are required to fix the existing schedules in order for them to be useful in a schedule analysis. This is discussed in Section 9 of this article. A schedule analysis that is based on defective schedules is easily discredited by the opposing party.

5. SELECT SCHEDULE WINDOWS

Based on the work completed in the steps above, the analyst will have an understanding of the scope of the project, parties involved, project schedules, issues and impacts, and the time period that is necessary to be analyzed for the delay analysis. With these items in mind, the analyst must select the schedules that will be used as the beginning and end of the schedule windows. These windows become the periods of time that will be studied in the analysis.

The steps discussed in the preceding Sections are important because the issues on the project may be a factor in the selection of schedule windows. For example, if a change order has been issued to the contractor which compensated the contractor for any and all schedule and cost impacts up to the date of the change order, it may only be necessary to perform an analysis from the date of the change order until the end of the project.

Another consideration of schedule windows is the timing of significant project milestones or impacts. A significant project milestone may be the completion of structural concrete work or a building achieving watertight (or weatherproof) status that allows interior work to begin. Schedules with data dates near these milestones may be selected, if appropriate. If significant impacts begin after a building is weatherproofed, that milestone may be an appropriate place for the start of a new window. Similarly, if the project record indicates that there were no issues prior to a major milestone, the milestone may be a good starting point for the delay analysis (*i.e.*, the entire project may not need to be part of the analysis).

Another prudent option for the selection of windows is the timing of delay events. If schedules are available with data dates near the beginning or end of impacts, these schedules may be useful as schedules to select for the analysis. Similarly, if it is noted that the completion milestone is significantly delayed in one (or more) of the updates, this may also be a prudent selection for the end of a schedule window.

Once the schedules are selected, the schedule data dates establish the beginning and/or ending dates of the schedule windows. An example of five schedule windows is provided in Table 1 below:

Table 1
Sample Schedule Windows

Window No.	Schedule Window Dates	Schedule Data Date (Beginning of Window)	Schedule Data Date (End of Window)	Length of Window (Cal. Days)
1	21 October 2013 – 28 January 2014	21-Oct-2013	29-Jan-2014	101
2	29 January 2014 – 20 March 2014	29-Jan-2014	21-Mar-2014	52
3	21 March 2014 – 27 July 2014	21-Mar-2014	28-Jul-2014	130
4	28 July 2014 – 25 October 2014	28-Jul-2014	26-Oct-2014	91
5	26 October 2014 – 5 December 2014	26-Oct-2014	06-Dec-2014	42

As indicated in the table, the schedule windows begin on the data date of the schedule that is selected to start the window. The end date of the schedule window is the day prior to the data date of the schedule selected for the end of the window. As shown in the table, the windows have different period lengths. It is often more important to have the windows based on key project events, as discussed above, rather than simply selecting a common length for each of the windows.

It is important to note that the consideration of the schedule updates is a very important step in the analysis. The AACE International RP 29-03 states:

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> *Every update may not be used. However, every update should be considered. Accuracy is reduced if updates are not evaluated for multiple-month periods when schedule revisions or changes in sequence occurred to the project plan.*[4]

The above excerpt indicates another important aspect in the consideration of schedule windows. If a major schedule revision takes place such as a re-baseline or addition of significant scope, an additional window may be needed near the date of the event.

6. IDENTIFY THE CRITICAL AND NEAR-CRITICAL PATHS

For each schedule that will be used in the analysis, the critical and near-critical paths must be reviewed and documented. When the analyst is performing the windows analysis, it will be necessary to understand the critical and near-critical paths in each of the updates. As will be discussed later in this article, the critical paths will be compared to determine the changes that occur within the schedules between the updates.

For this step, Long International sets up activity codes in the scheduling software and identifies the driving paths to the completion activity. As the activities on these paths are identified, the activities are coded and the codes can then be used to filter for the critical paths.[5]

As the critical and near-critical paths are reviewed and documented, the paths must be checked for reasonableness. Improper constraints may have been placed on activities which affect the paths or the use of large positive lags or negative lags may be a factor. Additionally, there may be gaps between activities which result in periods of inactivity along the paths. The analyst should document these issues and identify if corrections to any activities are necessary. Corrections to the schedules are discussed in Section 9 of this article.

The coding of the critical and near-critical paths is an important step in the analysis and the use of the coding is explained later in this article.

6.1 VERIFY THE ACTUAL DATES FOR CRITICAL AND NEAR-CRITICAL PATH ACTIVITIES

A very important step that is often overlooked in a forensic schedule analysis is the verification of actual dates. Because the actual dates form the basis of when work begins and completes, the

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4 AACE International's Recommended Practice 29R-03, Forensic Schedule Analysis, Section 3.3.E.4, page 52.

5 For more detail regarding Long International's procedure for identifying and coding the critical path, see the article "Considerations for Identifying and Analyzing the Critical Path", which can be found on our website (www.long-intl.com).

actual dates establish when delays begin and end. The verification of these dates allows the analyst to be certain that the actual dates, as contained in the project schedules, are correct.

This step is often omitted due to time and budget constraints. It is time consuming to wade through project documentation to determine when work occurred and it is often difficult to find documentation for each activity. Often, actual dates and as-built schedules become part of the project record and the actual dates become the historical dates for the activities. Date accuracy can be of value, or a detriment if inaccurate, to the contractor in a claim situation. It is difficult for a contractor to argue against an actual date when the date is contained in a schedule that was updated by the contractor's staff.

If time and budget preclude the analyst from verifying all actual dates, it is recommended to verify the actual dates on the critical and near-critical paths. Because these dates affect the results of the analysis, incorrect dates will produce erroneous analysis results.

If the verification of actual dates is not completed, it is recommended to compare actual dates between several of the update schedules. If the actual dates are consistent, the analyst may be assured that the as-built history is consistent. Regardless of the approach to the validation of actual dates, the analyst should document if and how actual dates were or were not validated.

7. PERFORM A DETAILED REVIEW OF THE SCHEDULES SELECTED FOR THE ANALYSIS

Upon reviewing and coding the critical and near-critical paths, each schedule should be reviewed in detail to determine if any schedule corrections are necessary. Although the project schedule is intended to be the key management tool for the project team, Long International often finds that schedules are deficient because errors or omissions cause the schedule to be inaccurate. If the analyst uses these deficient schedules for the analysis, the results of the analysis may not be correct.

It is important to evaluate the quality and reasonableness of the schedules and identify items that may be necessary to correct to ensure schedule accuracy. Typical items that can affect the analysis include:

- Excessive number of open-ended activities
- Overuse of constraints
- Activity and logic changes
- Duration changes
- Calendar changes
- Activities with unreasonably large total float values
- Inconsistent use of schedule calculation methods

- Incorrect as-built dates
- Excessive positive or negative relationship lags

The correction of some or all of any noted deficiencies may result in different forecasted activity dates and total float values. These changes may result in a change to the critical and near-critical paths, which in turn, may result in different delays and subsequent delay allocation. Without fixing the schedule deficiencies, the analyst may make incorrect conclusions regarding responsibility for delay. The corrections to the schedule and subsequent re-examination of the critical and near-critical paths are discussed below. Several common schedule deficiencies and problems are discussed briefly below. Changes made between the schedules selected for the windows are discussed in Section 8.

7.1 OPEN-ENDED ACTIVITIES

One of the most fundamental quality checks is to determine the number of open ends in the schedules selected for the analysis. Open-ended activities are defined as activities that lack a predecessor, successor, or both. It is commonly accepted in the construction scheduling industry that all activities should have at least one predecessor and one successor. The exception to this is the project start activity (which does not require a predecessor) and the project completion activity (which does not require a successor).

A large number of open-ended activities will create float values and forecasted completion dates that may be incorrect. Correction of these open ends will change the float values and dates and may affect the critical and near-critical activities and associated dates.

The analyst may encounter instances in which an activity had a successor removed in an effort to mitigate delay and may find that this successor was a hard logic link that was required in the schedule. The analyst may find that the correction of this link changes the critical path and, therefore, has an impact on the results of the analysis.

7.2 OVERUSE OF CONSTRAINTS

The use of a constraint restricts the start or finish of an activity. Although the use of a few constraints in schedules is not bad practice, a large number of constraints should be avoided. The use of constraints restricts the normal forward and backward path scheduling calculations. These calculations determine the forecast activity dates and float values. Therefore, the misuse of constraints may generate artificial activity dates and float values.

It is Long International's experience that constraints are often used by schedulers as a shortcut method to update a schedule or to address out-of-sequence work. When reviewing the constraints on a schedule, the analyst must evaluate the relevance of the constraint to determine the reason for its use, and to determine if the constraint should be removed from the schedule.

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7.3 USE OF CALENDARS

The use of calendars is an important, and often overlooked consideration when reviewing the schedules selected for the analysis. There are several aspects of the project calendars that must be considered.

The first consideration is the calendars themselves. It is important to note if the specific calendars were changed during the evolution of the schedules. If a five-day, eight-hour per day calendar is changed to a five-day, ten-hour per day calendar, the effects on the schedule will be significant and these types of changes must be understood and documented by the schedule analyst.

It is also important to note if the calendar(s) include planning for adverse weather. A properly developed schedule will include anticipated lost time due to inclement weather. This planning should be based on any pertinent contractual requirements and historic weather data specific to the geographical area of the project.

The final consideration when evaluating the schedules is to determine if activities had a calendar change during the selected schedule window. For example, if certain activities were changed from a five-day calendar to a six-day calendar, the effects on the schedule will be significant and must be considered in the analysis. Changes between schedule updates are discussed in more detail in the next Section of this article.

8. DETERMINE THE CHANGES MADE BETWEEN THE SCHEDULES SELECTED FOR THE SCHEDULE WINDOWS

In addition to the deficiencies in the individual schedules that must be identified, it is also necessary to understand the changes made between each of the schedule updates which are used for the windows. Although changes due to progress updating will naturally be present in the updates, there are items which must be checked to determine if delays or acceleration efforts are being added or removed from the schedules. The changes may be in the form of activity changes, logic changes, or duration changes. These changes are discussed briefly in the Sections below.

8.1 ACTIVITY AND LOGIC CHANGES

Because the contemporaneous period analysis methodology is observational, the schedules at the beginning and end of a window will be compared to determine delays. Therefore, it is important to understand all activity and logic additions or subtractions. The analyst must document any activity additions or subtractions, as well as any modifications to schedule logic. These factors may be important when calculating duration and date variances, which is discussed later in this article.

For example, the analyst may find that an activity was added in the schedule update process and the activity that was added is on the critical path and was the cause of delay in the window. If the activity represents a scope increase from a change order, the particular delay may be excusable and compensable. Conversely, if the activity represents original contract scope that was not included in the earlier schedules, this is the responsibility of the contractor and would not be excusable nor compensable. Although good scheduling practice generally involves maintaining activities and adding scope with new activities, many contractors add scope simply by adjusting the duration of an activity. These instances must be noted.

Similarly, the addition or deletion of logic may be relevant to the analysis. The analyst may find that modified logic and or lag values were used to model delay or acceleration.

An additional item that may be relevant to check is the consistency of Activity ID's and names between the schedule updates. It is generally good scheduling practice to maintain the consistency of activity identification and a comparison of activities can sometimes help the analyst understand the quality of the contractor's scheduling efforts. If activities are continually changing ID's and names and many activities are added and deleted through the update process, the analyst may conclude that the contractor's scheduling efforts were not in accordance with industry accepted and standard practices. If this problem is encountered, a delay analysis is often difficult to perform due to the lack of consistency in the activities.

8.2 ACTIVITY DURATION CHANGES

As briefly mentioned above, contractors may modify the scope of an activity by adjusting the original or remaining duration. Although this is generally not good scheduling practice, the analyst must be aware of these types of changes in the windows prior to performing the analysis. If the analyst notes a delay to an activity and upon research discovers that the delay was caused by the increased original or remaining duration of an activity, the changed duration will need to be researched to determine if the increase was justified. Long International has encountered multiple instances of an increased remaining duration on an in-progress activity which caused delay in a schedule window. Upon investigation, it was determined that the scope of the activity was not changed and the increased remaining duration caused delay which was then attributed to the contractor.

When faced with delays in the schedules, many contractors will simply reduce activity durations to mitigate delay. This is often done without any basis and may or may not reflect the plan for the work. These instances must be noted for the analysis.

9. MAKE COPIES OF THE ANALYSIS SCHEDULES AND IMPLEMENT NECESSARY CORRECTIONS

Prior to making changes to the project schedules, the analyst should make copies of the original schedule files. It is recommended that any changes to the schedule be made in copies of the original files, and not in the original copies within the schedule software. The analyst may need to refer back later to the original schedules. The prior analysis steps may have identified the deficiencies in the schedules that need to be corrected. Each of the corrections is implemented in this step and each change must be made in all of the analysis schedules. It is the analyst's prerogative to implement corrections that may be redundant. For example, if a not-started activity is missing a predecessor in the early updates, the addition of a predecessor will most likely be needed. However, if the activity remains without a predecessor in the later updates but the activity is in-progress or complete, the addition of a predecessor in those schedules may not be needed.

It is important to note that the AACE International Recommended Practice 29R-03 recognizes that corrections to the schedules are an acceptable part of the methodology. The Recommended Practice states:

> *The issue of correcting the schedule is one of balance and reasonableness and, for this reason corrections should not be made across the board or automatically.*[6]

The excerpt above, however, indicates that the analyst should not simply make arbitrary changes or changes without a basis. Each change must be carefully considered and there must be a valid basis for making the change. Each change and the basis for the change must be well documented.

9.1 REVIEW CRITICAL AND NEAR-CRITICAL PATHS

Upon implementing the schedule corrections and rescheduling the updates, the critical and near-critical paths must be re-evaluated to determine if the corrections of the schedule deficiencies caused a change to any of the paths. If no changes to the critical or near-critical paths are observed, the analyst can proceed to the next step. However, if changes to the paths are noted, additional research may be required.

At this time, the analyst must identify which change he or she implemented that caused the change to the critical path. Once this change is identified, the validity of the change must be reevaluated. If the change is appropriate, the analyst is advised to consult with the client to discuss the change and the critical paths before and after the change. These discussions may help the analyst understand the nature of the change and which scenario best represents what the parties knew contemporaneously when the schedule was updated and submitted.

In some cases, if the client is uncertain and the project team is unavailable (as is sometimes the case in forensic analysis), the analyst must make a decision on the best option and which critical path reflects the work as of the data date. This decision must not be made in the best interests of the client, but must reflect the most accurate portrayal of the project record.

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6 AACE International's Recommended Practice 29R-03, Forensic Schedule Analysis, Section 3.3.K.4, page 57.

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It is vital to document all changes that are made to the schedule updates and to document any changes to the critical paths including identifying which schedule changes caused any deviations.

10. DEVELOP VARIANCE TABLES TO CALCULATE DATE AND DURATION VARIANCES

After identification and confirmation of the critical and near-critical paths, Long International may develop variance tables for each window which calculate the date and duration variances for each activity within the schedule windows. Because delays can be the result of an activity not starting on time and/or an activity taking longer than planned, it is necessary to perform variance calculations for the date and duration of the activities.

For this step, Long International typically exports the activities and associated activity data to a spreadsheet for the development of the variance tables. Using the spreadsheets for the two schedules which correspond to the beginning and end of a schedule window, a variance spreadsheet can be developed which calculates the date and duration variance. Each spreadsheet will be the summary of the window and documents the variance (gain or delay) for each activity's original duration, remaining duration, start date, and finish date. An excerpt from a sample variance table is included in Table 2 below:

Table 2
Sample Variance Table

Activity ID	TF (Days)	Activity Status	LI CP	05-Sep-13 OD (Days)	05-Oct-13 OD (Days)	OD Var. (Days)	05-Sep-13 Start Date	A	05-Oct-13 Start Date	A	Start Var.
D1590	-51	Not Started	CP1	8	8	0	07-Oct-2013		14-Nov-2013		38
M1500	-45	Not Started		1	1	0	13-Sep-2013		22-Oct-2013		39
M2010	-43	Not Started		6	4	-2	11-Sep-2013		11-Oct-2013		30
S1480	-51	In Progress	CP1	10	13	3	24-Jun-2013	A	24-Jun-2013	A	0
S1620	-45	Not Started		5	12	7	07-Sep-2013		17-Oct-2013		40
S1760	-38	In Progress		9	9	0	03-Sep-2013		05-Sep-2013	A	2
S1835	-51	In Progress	CP1	6	6	0	28-Jun-2013	A	28-Jun-2013	A	0

TF – Total Float CP – Critical Path OD – Original Duration A – Actual Var. – Variance

Note that this table has been condensed and the finish variance and remaining duration variance is not shown. Additionally, the activity name has been omitted for this view but should be included on the table. As indicated in the table, the critical path activity code, LI CP, is shown and indicates which activities in the table are on the critical path.

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After the variance table is developed, Long International filters the spreadsheet for the critical and near-critical activities and determines which of the activities are the cause(s) of delay in the window. The activities that are found to be the causes of delay in each window may be referred to as critical path originating activities. These are the activities that must be researched to determine the allocation of delay. This step is discussed in the following Section.

11. RESEARCH ACTIVITY IMPACTS AND ALLOCATE RESPONSIBILITY FOR DELAYS

For each critical path originating activity identified in the prior step, the schedules and contemporaneous project documentation must be researched to determine the factor or factors that may have caused the start delay and/or extended activity duration. As discussed above, modifications to schedule activities and logic may be pertinent in this exercise. Activities and logic may have been modified as acceleration measures, or delay may have been added via duration adjustments. If these instances are noted, the project record must be analyzed to determine if these changes were supported. A sample of documented critical paths, originating activities, and delay summary are included in the table below:

Table 3
Critical Paths and Originating Activities

Critical Path	Activity ID	Activity Description	Delay Summary
1st Critical Path	A1800	Excavate for Sump A19	22 day finish delay
	A1790	Install Sump A19	15 day start delay due to excavation – OD/RD decreased from 12 to 4 days
	A1810	Excavate for Underground Sump Tank	5 day OD/RD decrease
2nd Critical Path	P1825	Complete Pipe delivery for 30" Raw Water Line	36 day finish delay
	P1775	Install Raw Water Piping	15 day finish delay
	P1750	Backfill Raw Water Piping	8 day start delay and 25 day finish delay

OD – Original Duration RD – Remaining Duration

If the delays to the originating activities are greater than the delay to the completion milestone in the window, the contractor most likely implemented acceleration measures in the schedules for the window. In this case, the research noted above pertaining to the revised durations and logic can assist the analyst to understand these changes (*i.e.*, acceleration measures). For example, Table 3 above indicates that the activities experienced different amounts of delay. Although the maximum delay is 36 days, if the completion milestone was delayed ten days during the window, the analyst would allocate the ten days of delay, not 36 days.

As previously discussed, one of the shortfalls of the contemporaneous period methodology can be the inability to differentiate specific owner and contractor delays. If the results of the analysis indicate that there are delays by both parties that are greater than the total delay recognized in the window, the analyst may conclude that concurrent delay exists in the window. Depending on the particulars of the contract, in many cases involving concurrent delay, the contractor is entitled to a time extension for the delay but the delay is not compensable. However, if owner and contractor delays are present that are each less than the total delay in the window, it may not be possible to determine the exact duration of concurrency.

It is also necessary to research any potential weather impacts during the window to determine if part, or all, of the delay is due to adverse weather. Lost time due to inclement weather may change the apportionment of delay if the weather delay is concurrent with a contractor delay. Weather delays are typically excusable, but not compensable, and the contract terms should be reviewed prior to allocating delay due to weather.

The analyst must perform this research and allocation for each of the schedule windows. Upon completion of the exercise, the total delay allocation should be summed and documented.

12. CONCLUSION

There are many considerations involved in the selection of a forensic delay analysis methodology. If a modeled analysis is not warranted, the contemporaneous period analysis may be a suitable methodology to implement. The analysis provides a detailed and comprehensive study of the project schedules and can be used to identify project delays on a windows basis.

It is imperative that the analyst considers all of the factors discussed in Section 2 of this article prior to selecting a delay methodology. Once selected, the analysis must be done thoroughly and correctly and each step discussed in this article should be considered, and if necessary, implemented. The analyst must always keep in mind that a delay analysis that is done incorrectly and/or without basis may be easily discredited by an opposing delay expert.

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About the Author

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