

Greenway Chambers CPD Series

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Delay and Disruption - the Society of Construction Law Protocol

Introduction

1. In October 2002, the Society of Construction Law in the UK released a Delay and Disruption Protocol. It was the work of sub-committee of members, and its stated object was to provide useful guidance on some common issues that arise in construction contracts where one party wishes to claim an extension of time and/or compensation for additional time and resources used to complete a project.
2. Further, the stated purpose of the Protocol was to provide a means by which parties can resolve these matters and avoid unnecessary disputes.
3. In June 2016, the Society of Construction Law in the UK released its consultation draft of the 2nd edition of the Delay and Disruption Protocol. The consultation draft was issued to encourage comments and input from various sources, including from members of the Society of Construction Law Australia.
4. This papers and presentation is intended to address the following:
 - a. the matters addressed by the 2002 Protocol;
 - b. the consideration of the 2002 Protocol in certain cases;
 - c. some criticisms of the 2002 Protocol;
 - d. the significant changes to the 2002 Protocol made in the 2016 Consultation draft.

The 2002 Protocol

5. The 2002 Protocol is set out as follows:
 - a. Introduction;
 - b. Core Principles relating to delay and disruption;
 - c. Guidance Notes;
 - d. Glossary and Definitions.

Introduction

6. The Introduction describes the object and purpose of the 2002 Protocol. It also makes it clear that the 2002 Protocol is not intended to be a contract document, and it does not purport to take

precedence over the express terms of the contract or be a statement of the law. It is stated to be a scheme for dealing with delay and disruption issues that is balanced and viable.

7. Further, it is stated that the 2002 Protocol has been prepared to provide guidance as to matters that should be addressed when a contract is being drafted and negotiated, as well as for the management of claims for delay and disruption as they arise in the course of a project.

The Core Principles

8. There are twenty one (21) Core Principles which the 2002 Protocol identifies as fundamental to the delay and disruption in the context of the construction contracts. These are set out in the annexure to this paper. In short terms, the Core Principles address:
 - a. the utility of a properly prepared programme, the preparation of updated programmes and the maintenance of site records;
 - b. the purpose, entitlement and procedure for extensions of time;
 - c. the effect of delay;
 - d. the impact of float and concurrency in the context of delay, extensions of time and compensation;
 - e. delay analysis, both contemporaneously when delay events occur and after completion of the works (or substantially later in time);
 - f. the basis for calculating compensation for prolongation;
 - g. global claims;
 - h. acceleration; and
 - i. disruption.

Guidance Notes and the Glossary

9. The Guidance Notes provide more detailed consideration of the Core Principles, as recommendations as to dealing with delay events and claims as they arise.
10. The Guidance Notes consider practical matters, such as the need for the preparation of good baseline programme, the maintenance of detailed site records, and the regular updating of the baseline program to accurately reflect progress and plan completion in the course of the works.
11. Further, the Guidance Notes provide definitions, recommendations, and assessment of the various terms and concepts used in delay and disruption claims, which are supplemented by Appendix A, which contains definitions and a Glossary of terms.
12. The Guidance Notes also provide guidance and consideration as to commonly used methods for delay analysis, including the *pros* and *cons* of certain methods depending on the nature of the claim, the potential costs, and the forum where the claim is to be assessed.

Consideration of the 2002 Protocol in certain cases

13. The 2002 Protocol has received some limited consideration by the courts in the UK and Australia. Generally speaking, the 2002 Protocol has been recognised as containing useful observations as to delay and definitions ¹, but as being of limited utility in circumstances as to causation and entitlement, and where the contract terms define the parties rights and liabilities ².
14. In Australia, consideration of the 2002 Protocol has generally been limited to particular applications and given brief consideration ³.
15. The most extensive consideration of the Protocol was in the decision of Bleby J in *Alstom v Yokogawa Australia (No 7)* ⁴. In this decision, the Protocol was used to address the evidence of the delay experts called by each party with regard to the meaning of terms such as "critical path", "logic links" and "resource levelling".
16. Further, Bleby J referred to the Protocol to consider methods of delay analysis when considering the effect of events and the impact on a project after completion of the works or at some substantially later time than when the events occurred and the various recommendations made about these methodologies ⁵. It was then used as a basis to prefer the *As Planned v As Built Analysis* that was used by the other expert and is recognised in the 2002 Protocol ⁶ rather than the *Resource Analysis* approach that had been used by the other expert ⁷.
17. It is perhaps not surprising that the 2002 Protocol has received only limited consideration in various cases, given that its stated object is allow parties to resolve matters relating to delay and disruption claims and to avoid unnecessary disputes. Further, it is expressed to be simply guidance, and disavows any notion that it is a contract document, takes precedence over the terms of any contract or is a statement of the law.

Criticisms of the 2002 Protocol

18. Leaving aside any issues as to the stated object or purpose of the 2002 Protocol, there have been certain criticisms of it and the extent to which it may be considered useful or assistance.

Disruption

19. While the 2002 Protocol was stated to be concerned with delay and disruption, its treatment of disruption was rather cursory. It was described by Core Principle 21 as follows:

¹ For example, see *Mirant Asia-Pacific Construction v Ove Arup* [2007] EWHC 918 (TCC).

² In particular, as to legal causation issues - *Adyard Abu Dhabi v SD Marine Services* [2011] EWHC 848; *Leighton Contractors v Stelux Holdings* per Hong Kong High Court, [2004] HKFCI 804. See also the criticism of *Core Principle 12* and the utility of the *Time Impact Analysis* in respect of the assessment of delay and extensions of time after completion of the works.

³ *620 Collins Street v Abigroup Contractors (No 1)* [2006] VSC 490 (appeal from an arbitral award, where the arbitrator had accepted expert evidence as it generally satisfied the guidelines in the Protocol, and therefore provided a reasonable basis for assessing the effect of claimed delays. No misconduct found on the part of the arbitrator, but no specific treatment was given to the Protocol; *SMEC Australia v McConnell Dowell Constructors* [2012] VSC 557 (strike out application refused; no close scrutiny of the analysis which relied on the Protocol).

⁴ [2012] SASC 49.

⁵ [2012] SASC 49 at [1271]-[1276].

⁶ [2012] SASC 49 at [1310]-[1323].

⁷ [2012] SASC 49 at [1277]-[1289].

Disruption (as distinct from delay) is a disturbance, hindrance or interruption to a Contractor's normal working methods, resulting in lower efficiency. If caused by the Employer, it may give rise to a right to compensation either under the contract or as a breach of contract.

20. In the Guidance Notes part of the 2002 Protocol (at Section 1.19), the concept of disruption is generally discussed, and the need for the "good site records" to be kept and furnished to support any disruption claim is recommended.
21. However, as noted by Julian Bailey in his paper *The Society of Construction Law Delay and Disruption Protocol: a Retrospective Analysis*⁸, what is "signally absent from the Protocol in relation to disruption is the type of detailed recommendations that the Protocol offers in relation to delay".
22. Bailey regards this as significant matter. Quite simply, in circumstances where "disruption claims are, forensically, one of the most difficult claims to make successfully", the topic is simply "underdone" as "the Protocol does not go far enough insofar as disruption is concerned".
23. The current scheme, which applies to work performed pursuant to a contract made after the commencement of the section (15 January 2015) provides that the following warranties by the holder of a contractor licence or a person required to hold a contractor licence are implied in every contract to do residential building work.

Time Impact Analysis

24. Perhaps the most significant criticism of the 2002 Protocol was in respect of *Core Principle 12* and *After the event delay analysis*. By this *Core Principle*, and in the *Guidance Notes*, the 2002 Protocol recommended that, in deciding entitlement to an EOT after completion of the works, or at a substantially later time to when the alleged delay event occurred:

"... the adjudicator, judge or arbitrator should, so far as is practicable put him/herself in the position of the CA [Contract Administrator or Superintendent] at the time the Employer Risk Event occurred."

25. The methodology utilised to approach the assessment in this way is generally recommended to be *Time Impact Analysis*. In short terms, this method involves considering the effect of a delay event at the time that it occurred, acknowledging the progress of the works as at that date and the planned completion of the works to be performed.
26. The difficulty with this approach is that it proposes that the person deciding the matter "step back in time" to when the delay event occurred or when the extension of time claim was made and invites an assessment that disregards what actually then happened following the delay event or after the extension of time claim was considered (or supposed to be considered). As such, it has been described as being a "highly artificial exercise which removes delay analysis from the real world and puts it into an abstract realm of prediction if not conjecture".⁹
27. Where the courts and the parties are usually concerned to determine entitlements and claims by reference to concerned with "cause and effect", any assessment that proposes "cause and

⁸ Published November 2014, presented at the Society of Construction Law International Conference, Kuala Lumpur, on 20 September 2014.

⁹ Julian Bailey, *The Society of Construction Law Delay and Disruption Protocol: a Retrospective Analysis*.

speculation as to effect" rather than consideration of what in fact occurred has obvious negatives. This is particularly so where the claim for an extension of time is related to a claim for compensation or damages where the delay event is also a breach of the contract and the contractor claims to have suffered loss and damage. Damages, while ordinarily assessed at the time of breach, are fundamentally compensatory and therefore any assessment, conventional practice or analysis must fulfil this elemental object¹⁰.

The float

28. The Protocol makes certain statements as to the float. In short terms, the float is defined in the 2002 Protocol as the time available for an activity in addition to its planned duration.
29. By Core Principle 7, the 2002 Protocol states that project owns the float, as it is suggested that an extension of time for a delay event should only be granted to the extent that it is anticipated or expected to reduce the total float in the program to below zero days.
30. Although this principle is stated to be subject to any express provision of the contract to the contrary, it does presume to provide a legal assessment as to which party or parties "owns" the float. This question often arises where a claim for an extension of time is made so that the Contractor can retain for itself the benefit of the "float" in the program - i.e. where the delay will not necessarily cause it to complete the works after the nominated *Date for Practical Completion*.
31. In this regard, and by way of example, many standard form contracts provide that a Contractor may be entitled to an extension of time if an event "*may delay the work under the Contract*" or where the Contractor it is or will be delayed in achieving *Practical Completion*¹¹, rather than by reference to completion by the *Date for Practical Completion*. It is plainly arguable in this case that the Contractor owns the float.
32. Further, this conclusion is underscored in the *Australian Standards* examples given as the entitlement to an extension of time is specifically to be determined without regard as to whether then Contractor can achieve *Practical Completion* by the *Date for Practical Completion* without an extension of time being granted.
33. Therefore, while the Protocol states that it is not a contract document and is of no legal force, there are parts which do range into matters of contract rights and entitlements. Obviously, these statements should be given no weight or force, but arguably they should not be part of the 2002 Protocol at all.

Concurrent delays

34. Similarly, in the context of concurrent delays, Core Principle 9 purports to make a definitive statement as to the contractual entitlement of the Contractor to an extension of time where there are concurrent delays, to the effect that any concurrent delay should not reduce an extension of time otherwise due or arising from an event for which the Contractor is entitled to an extension of time.

¹⁰ See *Gagner Pty Ltd trading as Indochine Cafe v Canturi Corporation Pty Ltd* [2009] NSWCA 413 at [30] and [31] per Campbell JA, with whom McFarlan JA and Sackville AJA agreed, and the authorities there cited, including *Johnson v Perez* (1988) 166 CLR 351 at 355 per Mason CJ, 367 per Wilson, Toohey and Gaudron JJ, 386 per Dawson J.

¹¹ See, for example, clause 35.5 of AS4300-1995; clauses 34.2 and 34.3(a) of AS4000-1997.

35. Again, this is a matter of the relevant contract, of the law and of causation. While the statement may be consistent with some English authorities¹², it is not consistent with many contract terms and provisions, including the *Australian Standards* examples referred to above where a Contractor has a limited entitlement, or no entitlement, to an extension of time where there is concurrent delay¹³.

Global Claims

36. Lastly, and similarly, the 2002 Protocol has made statements as to the utility of global claims, which it states (by Core Principle 21) are "*rarely accepted by the courts*". Again, this seeks to make a judgment on the legal basis and entitlement to pursue such claims.
37. Further, in *Walter Lilly & Co Limited v Mackay*¹⁴ the UK court expressed a more open view of total cost or global claims. While noting that they present "added evidential difficulties", it was stated that there is nothing wrong in principle with such claims. Therefore, the statement in the 2002 Protocol by Core Principle 21 arguably does not reflect the more recent consideration of such claims by the courts in the UK.

The 2016 Consultation draft

38. Perhaps mindful of some of these criticisms, the 2016 Consultation draft of the Protocol has revised many aspects of its approach to delay and disruption. The following is an outline of the changes to the 2002 Protocol.

Introduction

39. While the stated object and purpose of the Protocol remains the same, the Introduction identifies key areas where the 2016 Consultation draft is intended to take a different or more refined approach.
40. It is again emphasised that the Protocol is not intended to be a contract document, and it does not purport to take precedence over the express terms and governing law of the contract, or be a statement of the law. It is intended to provide guidance which may be generally applicable to any contract that provides for the management of change.
41. The Introduction states that there is no longer a preferred delay analysis methodology where the analysis is undertaken after the completion of the works or at a substantially later time.
42. Further, the Introduction notes that there is a more developed guidance on disruption claims, although the preferred method for disruption remains the *Measured Mile Analysis*.

¹² e.g. *De Beers UK v Atos Origin IT Services* [2010] EWHC 3276.

¹³ AS4000-1997, clause 34.4 provides for "apportionment" where both a qualifying cause and a non-qualifying cause of delay overlap; clause 35.5 of AS4300-1995 provides that there is no entitlement to an extension of time in the event of concurrent delay where one of the causes of delay is not a nominated cause set out in clauses 35.5(a) or 35.5(b), except where the delay occurs after the Date for Practical Completion and the cause is one or more of the events listed in clauses 35.5(b)(i), (iv), (viii) and (ix).

¹⁴ [2012] EWHC 1773.

Core Principles

43. The Core Principles set out in the 2002 Protocol have been largely restated in the 2016 Consultation draft. However, there are revisions and additions, some of which are significant.

Programme and records (Core Principle 1)

44. The 2016 Consultation draft maintains that the Contractor should prepare a programme showing the manner and sequence in which the Contractor plans to carry out the works. This programme should be submitted before work commences and accepted by the Contract Administrator, Superintendent or the Principal, depending upon the contract regime.
45. The programme should be updated to record actual progress and any extensions of time (EOTs) granted, so that it can be used as a tool for managing change and determining EOTs and periods of time for which compensation may be due.
46. The 2016 Consultation draft adds that the contracting parties should reach a clear agreement on the type of records that should be kept.

Entitlement to extension of time (Core Principle 3)

47. The 2016 Consultation draft maintains that applications for an EOT should be made and dealt with as close in time as possible to the asserted delay event, and that that the Contractor will potentially be entitled to an EOT only for those events or causes of delay in respect of which the Principal has assumed risk and responsibility.
48. The 2016 Consultation draft adds the following as part of Core Principle 3:
- a. the parties and the Superintendent should comply with the contractual procedural requirements relating to notices, particulars, substantiation and assessment in relation to delay events;
 - b. a 'wait and see' approach to assessing EOT claims is discouraged and, where the Contractor has complied with his contractual obligations regarding delay events and EOT applications, the Contractor should not be prejudiced in any dispute as a result of a failure to assess EOT claims applications within a reasonable time after submission.

Procedure for granting extension of time (Core Principle 4)

49. The 2016 Consultation draft adopts a broader and less prescriptive approach to delay analysis. At Core Principle 4, the 2016 Consultation draft revises the previously stated position to hold that the procedure should be subject to the contract and be based on an appropriate delay analysis, with conclusions reached and derived from a common sense perspective.

Analysis time-distant from the event (Core Principle 12)

50. The 2016 Consultation draft recommends that delay analysis after completion of the works or considerably distant in time from the occurrence of the event or its impact should be avoided so far as is practicable, and that EOT entitlement should be considered as early as possible by the Contractor, the Principal and/or the Contract Administrator or Superintendent.

51. Further, Core Principle 12 states that an EOT entitlement should be assessed by the Contract Administrator or Superintendent within a reasonable time after the submission of an EOT claim by the Contractor. However, where an EOT claim is assessed after completion of the works, or significantly after the event or the delay has occurred, then the "prospective analysis of delay" referred to in Guidance Section 3 may no longer be appropriate (see Guidance Section 6).
52. As addressed, this represents a major shift in the position set out in the 2002 Protocol.

Global Claims (Core Principle 19)

53. The not uncommon practice of contractors making composite or global claims without attempting to substantiate cause and effect is discouraged by the Protocol, although Core Principle 19 now notes "*an apparent trend for the courts to take a more a more lenient approach towards global claims*". Further reference is made to Guidance Section 3.23.
54. Previously, the Protocol discouraged global claims on the basis that they were rarely accepted by the courts. The change in these statements appears to be directly informed by the decision in Walter Lilly Mackay referred to above.
55. It is important to note that any perceived "relaxation" or leniency with respect to global claims in the UK is not reflected by recent Australian decisions¹⁵.

Acceleration (Core Principle 20)

56. As previously stated in the 2002 Protocol, where the contract provides for acceleration, payment for the acceleration should be based on the terms of the contract.
57. Where the contract does not provide for acceleration but the Contractor and the Principal agree that accelerative measures should be undertaken, the 2016 Consultation draft recommends that the basis of payment should be agreed before the acceleration is commenced.
58. Where the Contractor is considering implementing acceleration measures to avoid the risk of liquidated damages as a result of not receiving an EOT that it considers is due, the Contractor should first take steps to have the dispute or difference about entitlement to an EOT resolved in accordance with the contract dispute resolution provisions.

Guidance Notes - Section 1 - definitions

59. Section 1 of the Guidance Notes is an introduction, which provides guidelines and definitions as to delay, disruption and acceleration, and the extent to which these concepts and issues may be interrelated.

Guidance Notes: Section 2 - records and programmes (Core Principle 1)

60. Section 2 of the Guidance Notes concerns Core Principle 1 - the need for good and accurate records and programmes. The Section provides an introduction to records generally, the type of records that should ordinarily be kept (programme, progress, resource and cost), and the utility of correspondence, administration records and tender documents.

¹⁵ See Mainteck Services Pty Ltd v Stein Heurtey SA [2014] NSWCA 184; DM Drainage & Constructions Pty Ltd v Karara Mining Ltd [2014] WASC 170.

61. Further, detailed guidelines are provided for the preparation, maintenance and updating of the construction programme(s), including activity durations, the use of necessary (and not excessive) logic links, identification of key resources for major activities and the critical path(s).
62. Section 2 of the Guidance Notes recommends that the construction programme should be able to be read in conjunction with the Contractor's method statement(s), so as to provide a complementary and detailed indication of the intended method(s) and sequence(s) of the works, key interfaces, and the proposed resources to be utilised.

Guidance Notes: Section 3 - delay disruption and acceleration (Core Principles 2 to 20)

63. Section 3 of the Guidance Notes deals with the issues addressed by Core Principles 2 to 20, and in particular the assessment and analysis of delay and extensions of time in the context of contract terms, float, concurrency, mitigation and acceleration, and the available compensation for delay and disruption.

Guidance Notes: Section 4 - other financial heads of claim

64. Section 4 of the Guidance Notes is concerned with other compensation that may be available where delay occurs, including interest as damages where there are financial charges that accrue, statutory interest on debts, head office costs and claim preparation costs.

Guidance Notes: Section 5 - extensions of time during the course of the project

65. Section 5 of the Guidance Notes sets out the approach recommended for assessment of extensions of time during the course of the project. It recommends the use of the Time Impact Analysis, which is described below.

Guidance Notes: Section 6 - delay analysis after completion of the project

66. Section 6 of the Guidance Notes concerns the consideration of EOT claims after completion of the works or at a time much later than the alleged delay event occurred. It recognises that the prospective analysis of delay referred to in Section 6 may no longer be relevant or appropriate which is a significant change to the position set out in the 2002 Protocol (as described above).
67. Further, whatever method of delay analysis is used, Section 6 (para 6.2) states that the overriding objective is to ensure that the conclusions derived are sound from a common sense perspective, particularly where there is a risk that the remaining duration projections, logic links, calendars and constraints within the baseline programme and/or the updated programme(s) might produce anomalous results.
68. The choice of method of delay analysis should be determined by reference to the following criteria:
 - a. the relevant terms of the contract;
 - b. the nature of the causative events;
 - c. the value of the project or dispute (to ensure a proportionate approach);
 - d. the time available for the analysis;

- e. the nature, extent and quality of the records available;
 - f. the nature, extent and quality of the programme information available; and
 - g. the forum in which the assessment is being made.
69. Section 6 identifies six (6) commonly used methods of delay analysis. In general terms:
- a. certain methods start with the identification and description of an event (a cause) and thereafter seek to establish its impact (the effect) - i.e.: Cause & Effect type analyses;
 - b. other methods start with identifying critical delay (an effect) and thereafter seek to establish what might have caused that delay - i.e.: Effect & Cause type analyses.
70. Delay analysis requires the identification of the critical path(s) to completion. Delays which impact completion are those which affect the critical path. The critical path may be a sequence or chain of activities through the remaining works or be a collection of related work activities to distinct sequences (e.g. where completion is being driven/determined by the rate of pipe welding across the works).
71. It is not necessary, although often convenient, to determine the critical path using specialist programming software. The critical path may sometimes be more reliably established through a practical analysis of the relevant facts, or by analysis of production and/or resource data.
72. Section 6 states that "*Criticality*" is determined in one of three different ways:
- a. purely prospective critical path assessments adopt the perspective evident at the outset of the project only and take no account of progress achieved;
 - b. contemporaneous critical path assessments adopt an evolving perspective over the course of the works and take account of the effects of:
 - i. the actual progress of works performed; and
 - ii. any changes in the method or sequence for future works;
 - c. retrospective critical path assessments adopt the perspective evident at the end of the project (or window of time).
73. Section 6 states that "*Delay Impact*" is determined in one of two different ways:
- a. a prospective delay analysis identifies the likely impact of historical progress or delay events on a completion date. The conclusions of a prospective delay analysis may not match the as-built programme because the Contractor's actual performance may well have been influenced by the effects of attempted acceleration, re-sequencing or redeployment of resources in order to try to avoid liability for liquidated damages, or due to other delay or disruption events;
 - b. a retrospective delay analysis identifies the actual impact of the delay events on the identified actual or as-built critical path.

74. A summary of the methods is then set out in a table:

Method of Analysis	Analysis type	Critical Path determined	Delay Impact determined	Requires
Impacted As Planned Analysis	Cause and Effect	Prospectively	Prospectively	Logic linked baseline programme Selection of delay events to be modelled
Time Impact Analysis	Cause and Effect	Contemporaneously	Prospectively	Logic linked baseline programme Selection of delay events to be modelled
Time Slice Windows Analysis	Effect and Cause	Contemporaneously	Retrospectively	Logic linked baseline programme Updated programmes or progress information to update the baseline programme
As-Planned v As-Built Windows Analysis	Effect and Cause	Contemporaneously	Retrospectively	Baseline programme As-Built data
Longest Path Analysis	Effect and Cause	Retrospectively	Retrospectively	Baseline programme As-Built programme
Collapsed As-Built Analysis	Effect and Cause	Retrospectively	Retrospectively	Logic linked As-Built programme Selection of delay events to be modelled

The Impacted As-Planned Analysis

75. This method assesses delay events by using a logic-linked baseline programme to determine the prospective impact these events have on the predicted contract completion dates shown within the baseline programme.
76. The method requires confirmation of the sequences and durations for the works shown in the programme as reasonable, realistic and achievable, and properly logically linked.
77. In general, this is thought to be the simplest and least expensive form of delay analysis, but it does not consider actual progress and changes to the original plan for the works, and therefore has obvious limitations. It is most likely acceptable (subject to the terms of the contract) where any delay events occur at the commencement of the works or at early stages or progress.

The Time Impact Analysis

78. This is the method used in Section 5 of the Guidance Notes for the contemporaneous assessment of an EOT application.

79. This method assesses delay events by using an updated logic-linked baseline programme to determine the prospective impact these events have on the predicted contract completion dates shown within the updated baseline programme at the time that the events occur.
80. Again, the method requires confirmation of the sequences and durations for the works shown in the programme as reasonable, realistic and achievable, and properly logically linked. Further:
- a. it must be established that the "update" to the baseline programme accurately reflects the actual progress of the works; and
 - b. mitigation and acceleration already incorporated into the updated baseline programme need to be identified so that these do not conceal or distort the projected impact of the delay events.
81. The number of delay events being modelled has a significant impact on the complexity and cost of using this method.
82. The analysis is intended to determine the likely effect of the modelled delay events on the programme/critical path at the time when the delay events occurred. This method usually does not address or determine the actual delay caused by the delay events, as subsequent project progress is not considered.

The Time Slice Analysis

83. This is one of two 'windows' analysis methods, and assesses delay by use of contemporaneously updated baseline programmes or revised contemporaneous programmes which show the status of the works at various "snapshots", or time slices, throughout the course of the project.
84. Through this process, the progress of the works is divided into windows. The "snapshots" or time slices are typically carried out at monthly intervals.
85. The series of time slice programmes show:
- a. the contemporaneous or actual critical path in each window as the works progressed; and
 - b. the critical delay status at the end of each time slice,
- thus determining the extent of actual critical delay incurred within each window.
86. Thereafter, the project records are assessed and evidence may be given as to events as they occurred to consider the cause(s) of the identified critical delay in each window.
87. For each time slice programme, it is necessary that the updated programmes reflect the actual progress of the works and that the proposed future sequences and durations for the works are reasonable, realistic and achievable, and properly logic linked.

The As-Planned versus As-Built Windows Analysis

88. This is the second of the 'windows' analysis methods. As distinct from a *Time Slice Analysis*, it is often used when:

- a. there is concern as to the validity or reasonableness of the baseline programme and/or the accuracy or otherwise of the contemporaneously updated programmes;
 - b. there are too few contemporaneously updated programmes.
89. The duration of the works is broken down into windows, which are then considered using revised contemporaneous programmes, contemporaneously updated programmes, milestones or significant events.
90. The contemporaneous or actual critical path is determined in each window by a "*common-sense and practical analysis of the available facts*" (Section 6.6(d)). As this does not substantially rely on programming software, the rationale and reasoning by which criticality has been determined must be described and be sound.
91. Key dates along the contemporaneous or actual critical path against corresponding planned dates in the baseline programme are then compared to identify the occurrence and extent of critical delay in each window.
92. As with the *Time Slice Analysis*, the project records are then assessed and evidence may be given as to events as they occurred to consider the cause(s) of the identified critical delay in each window. The critical delay incurred and the mitigation achieved in each window is accumulated to identify critical delay over the duration of the works.

The Longest Path Analysis

93. This method uses a retrospective As-Built critical path, by reference to a verified or developed As-Built programme.
94. The As-Built programme shows the longest continuous path backwards from the actual completion date to determine the As-Built critical path. The incidence and extent of critical delay is then determined by comparing key dates along the As-Built critical path against corresponding planned dates in the baseline programme.
95. As with the *Time Slice Analysis* and the *As-Planned versus As-Built Windows Analysis*, the project records are then assessed and evidence may be given as to events as they occurred to consider the cause(s) of the identified critical delay. The method may be of limited utility where changes to the critical path during the course of the works occur and are not recognised or allowed for.

The Collapsed As-Built (or But-For) Analysis

96. This method involves the extraction of delay events from the As-Built programme to consider what might have happened had the delay events not occurred.
97. This method does not require a baseline programme, but does require a detailed logic-linked As-Built programme. It is usually the case that such a programme will need to be developed using project records, as built information and by incorporating logic to a verified As-Built programme (if one exists). This can be a time consuming, complex and costly endeavour.
98. Once completed, the delay events affecting the As-Built Programme are identified and they are "collapsed" or extracted in order to determine the net impact of the delay events.

Recommendation

99. No recommendation as to any method is given in the 2016 Consultation draft, other than by reference to the introductory statements to the effect that the method selected should best reflect the criteria stated above. Further, it is recommended that, to avoid or at least minimise disputes over methodology, the parties agree an appropriate method of delay analysis.

Guidance Notes: Section 7 - disruption claims

100. Section 7 concerns disruption claims. Whereas one of the criticisms of the 2002 Protocol was its rather light treatment of disruption claims, this section provides guidance on the making and assessment of disruption claims.
101. As noted by Core Principle 21, disruption concerns a loss of productivity or efficiency in the execution of particular work activities - because events work activities are not able to be carried out as efficiently as reasonably planned (or as possible).
102. Disruption events can have:
- a. a direct effect on the works by reducing productivity, such as:
 - i. piecemeal site access different from that planned;
 - ii. out of sequence works or design changes.
 - b. an indirect effect on the works and productivity, such as:
 - i. the crowding of labour or stacking of trades, affecting the space or time planned or anticipated for activities;
 - ii. dilution of supervision through fragmented work gangs;
 - iii. excessive overtime, which can lead to fatigue;
 - iv. repeated learning cycles and poor morale of labour which can further reduce productivity.
103. The loss and expense resulting from a loss of productivity may be claimed to the extent that the contract permits such a claim (e.g. latent condition or unforeseen ground conditions) or there is an available cause of action at law.
104. Further, disruption claims can be extremely difficult to establish, given there are usually many and intermingled events or circumstances that could be a cause of some loss of productivity. Depending upon the circumstances, it may not be possible or practicable to identify the causes or causes of a loss of productivity by reference to particular disruption events. Hence, disruption claims are often sought to be advanced utilising a composite approach (i.e. a global claim), which have inherent risks and frailties.
105. Disruption is to be shown by applying analytical methods to establish the loss of productivity arising out of the disruption events (and the resulting financial loss) and is not merely the difference between what actually happened and what the Contractor planned.

106. Section 7 of the Guidance Notes then goes on to address in considerable detail the presentation and assessment of disruption claims, perhaps conscious of the criticism levelled at the 2002 Protocol in this regard. It sets out:
- a. the starting point of a disruption analysis, being a review of productivity in carrying out the works over time in order to determine when lower productivity was achieved and what work activities were impacted;
 - b. the analysis should then continue with development of an understanding of what works were carried out, when the works were carried out and what resources were used, followed by a review of the financial loss incurred;
 - c. the need to maintain accurate project records as being equally as important for a disruption analysis as it is for a delay analysis.;
 - d. the several methods for the calculation of lost productivity resulting from disruption events, broadly distinguished between those which rely on actual or theoretical measurements of comparative productivity (productivity-based methods) and those which rely on analysis of planned and actual expenditure of resource or costs (cost-based methods), noting that:
 - i. productivity-based methods seek to measure the loss of productivity in the utilised resources and then to price that loss;
 - ii. cost-based methods seek more directly to ascertain the difference between actual cost and planned cost without first measuring productivity losses in the utilised resources.
 - e. Productivity-based methods include:
 - i. measured mile analysis;
 - ii. earned value analysis ;
 - iii. programme analysis ;
 - iv. work or trade sampling;
 - v. system dynamics modelling.
 - f. Cost-based methods include:
 - i. estimated versus incurred cost;
 - ii. estimated versus used labour.
107. Under appropriate circumstances, and in varying degrees, all of the methods may support a disruption claim, but it is considered in the 2016 Consultation draft that:
- a. the most reliable and accurate are project-specific studies, particularly a properly implemented measured mile analysis;

- b. an analysis which combines a productivity-based method and a cost-based method may provide useful cross-checking where it is proportionate to carry out two analyses;
- c. whichever method is used for identifying and establishing disruption and the resulting loss and expense, it is necessary to isolate issues that are likely to have impacted productivity but which are unrelated to the Employer's liability.

Conclusion

108. The 2016 Consultation draft of the Delay and Disruption Protocol develops and refines many aspect of the 2002 Protocol and responds constructively to criticisms made. While a most useful guide and statement of principles, the warnings as to its status and utility, described in its own terms by the Introduction and at various places throughout, must always be borne in mind when considering the Core Principles and the use of any guidelines or recommendations stated.

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The Core Principles - the 2002 Protocol

1. Programme and records - To reduce the number of disputes relating to delay and disruption, the Contractor should prepare and the Contract Administrator (CA) should accept a properly prepared programme showing the manner and sequence in which the Contractor plans to carry out the works. The programme should be updated to record actual progress and any extensions of time (EOTs) granted. If this is done, then the programme can be used as a tool for managing change and determining EOTs and periods of time for which compensation may be due.
2. Purpose of extension of time - The benefit to the Contractor of an EOT is to relieve the Contractor of liability for damages for delay (usually liquidated damages or LDs) for any period prior to the extended contract completion date. The benefit of an EOT for the Employer is that it establishes a new contract completion date, and prevents time for completion of the works becoming 'at large'.
3. Entitlement to extension of time - Applications for an EOT should be made and dealt with as close in time as possible to the delay event that gives rise to the application. The Contractor will potentially be entitled to an EOT only for those events or causes of delay in respect of which the Employer has assumed risk and responsibility (called in the Protocol, **Employer Risk Events**). The parties should attempt so far as possible to deal with the time impact of Employer Risk Events as the work proceeds (both in terms of EOT and compensation).
4. Procedure for granting extension of time - The EOT should be granted to the extent that the Employer Risk Event is reasonably predicted to cause Delay to Completion. The goal of the EOT procedure is the ascertainment of the appropriate contractual entitlement to an EOT; the procedure is not to be based on whether or not the Contractor needs an EOT in order not to be liable for liquidated damages.
5. Effect of delay - For an EOT to be granted, it is not necessary for the Employer Risk Event already to have begun to affect the Contractor's progress with the works, or for the effect of the Employer Risk Event to have ended.
6. Incremental review of extension of time - Where the full effect of an Employer Risk Event cannot be predicted with certainty at the time of initial assessment by the CA, the CA should grant an EOT for the then predictable effect. The EOT should be considered by the CA at intervals as the actual impact of the Employer Risk Event unfolds and the EOT increased (but not decreased, unless there are express contract terms permitting this) if appropriate.
7. Float as it relates to time - Unless there is express provision to the contrary in the contract, where there is remaining float in the programme at the time of an Employer Risk Event, an EOT should only be granted to the extent that the Employer Delay is predicted to reduce to below zero the total float on the critical activity path affected by the Employer Delay to Completion.
8. Float as it relates to compensation - If as a result of an Employer Delay the Contractor is prevented from completing the works by the Contractor's planned completion date (being a date earlier than the contract completion date), the Contractor should in principle be entitled to be paid the costs directly caused by the Employer Delay, notwithstanding that there is no delay to the contract completion date (and therefore no entitlement to an EOT), provided also that the Employer is aware of the Contractor's intention to complete the works prior to the contract completion date, and that intention is realistic and achievable.

9. Concurrent delay: its effect on entitlement to extension of time - Where Contractor Delay to Completion occurs or has effect concurrently with Employer Delay to Completion, the Contractor's concurrent delay should not reduce any EOT due.
10. Concurrent delay: its effect on entitlement to compensation for prolongation - If the Contractor incurs additional costs that are caused both by Employer Delay and concurrent Contractor Delay, then the Contractor should only recover compensation to the extent it is able to separately identify the additional costs caused by the Employer Delay from those caused by the Contractor Delay. If it would have incurred the additional costs in any event as a result of Contractor Delay, the Contractor will not be entitled to recover those additional costs.
11. Identification of float and concurrency - Accurate identification of float and concurrency is only possible with the benefit of a proper programme, properly updated.
12. After the event delay analysis - The Protocol recommends that, in deciding entitlement to EOT, the adjudicator, judge or arbitrator should so far as is practicable put him/herself in the position of the CA at the time the Employer Risk Event occurred.
13. Mitigation of delay and mitigation of loss - The Contractor has a general duty to mitigate the effect on its works of Employer Risk Events. Subject to express contract wording or agreement to the contrary, the duty to mitigate does not extend to requiring the Contractor to add extra resources or to work outside its planned working hours. The Contractor's duty to mitigate its loss has two aspects – first, the Contractor must take reasonable steps to minimise its loss; and secondly, the Contractor must not take unreasonable steps that increase its loss.
14. Link between extension of time and compensation - Entitlement to an EOT does not automatically lead to entitlement to compensation (and vice versa).
15. Valuation of variations - Where practicable, the total likely effect of variations should be pre-agreed between the Employer/CA and the Contractor to arrive if possible at a fixed price of a variation, to include not only the direct costs (labour, plant and materials) but also the time-related costs, an agreed EOT and the necessary revisions to the programme.
16. Basis of calculation of compensation for prolongation - Unless expressly provided for otherwise (e.g. by evaluation based on contract rates), compensation for prolongation should not be paid for anything other than work actually done, time actually taken up or loss and/or expense actually suffered. In other words, the compensation for prolongation caused other than by variations is based on the actual additional cost incurred by the Contractor. The objective is to put the Contractor in the same financial position it would have been if the Employer Risk Event had not occurred.
17. Relevance of tender allowances - The tender allowances have limited relevance for the evaluation of the costs of prolongation and disruption caused by breach of contract or any other cause that requires the evaluation of additional costs.
18. Period for evaluation of compensation - Once it is established that compensation for prolongation is due, the evaluation of that sum is made by reference to the period when the effect of the Employer Risk Event was felt, not by reference to the extended period at the end of the contract.

19. Global claims - The not uncommon practice of contractors making composite or global claims without substantiating cause and effect is discouraged by the Protocol and rarely accepted by the courts.
20. Acceleration - Where the contract provides for acceleration, payment for the acceleration should be based on the terms of the contract. Where the contract does not provide for acceleration but the Contractor and the Employer agree that accelerative measures should be undertaken, the basis of payment should be agreed before the acceleration is commenced. It is not recommended that a claim for so-called constructive acceleration be made. Instead, prior to any acceleration measures, steps should be taken to have the dispute or difference about entitlement to EOT resolved in accordance with the dispute resolution procedures applicable under the contract.
21. Disruption - Disruption (as distinct from delay) is a disturbance, hindrance or interruption to a Contractor's normal working methods, resulting in lower efficiency. If caused by the Employer, it may give rise to a right to compensation either under the contract or as a breach of contract.