A New Construction Contract for the 21st Century

Time management

By Keith Pickavance

This is the second in a series of articles about the Chartered Institute of Building’s international construction Contract for use with complex projects.¹ In this, we look at an overview of the foundation of the time-control features of CPC2013, the dynamic time model and Progress Records, which set it apart from those of other standard forms of contract currently available.

The dynamic time model

Many contracts have programming or scheduling provisions of some sort, but no other standard form currently available sets out what is actually required in the way of quality of scheduling, or provides adequate sanctions for non-compliance. The JCT Standard Building Contract, 2011, for example, one of the UK’s most popular construction contracts, whilst containing some 17 pages of clauses dealing with costs adjustment, has just one on scheduling, which states:

“The Contractor shall without charge provide the Architect/Contract Administrator with his master programme for the execution of the Works identifying, where required in the Contract Particulars, the critical paths and/or providing such other details as are specified in the Contract Documents.”²

Although this contains an invitation to write something more extensive in the specification (and many do) in practice it is often ineffective because the conditions of contract do not provide any relationship with any other time related provisions of the contract, such as recovery, acceleration and extensions of time, nor do they provide any redress for non-compliance with anything specified.

AIA 201 (2007)³ and AS4000⁴ are equally brief and have the same shortcomings. Although FIDIC⁵ and NEC3⁶ contain more in regard to required content, none provide anything by way of which any quality control of scheduling can be exercised, nor any

² Clause 2.9.1.2.
³ Clause 3.10.1.
⁴ Clause 32.
⁵ Clause 8.3.
⁶ Clause 31.2.
redress for non-compliance. If the Employer wishes to have the opportunity of doing something other than just let the project slip into delay, a different approach to the problem of time management is needed.

CPC2013 is different in that it encourages the Employer to be proactive. Risk, time and cost are to be managed collaboratively and contemporaneously in line with the recommendations of the Society of Construction Law’s Delay and Disruption Protocol. This requires a dynamic critical path network as a time model (or Working Schedule as it is called in CPC2013). It is to be prepared in accordance with a default specification for the design, production and maintenance of the schedule, contained in the Contract Appendices and is to conform to the guidelines in the CIOB’s Guide to Good Practice in the Management of Time in Complex Projects (“the Guide”)\(^7\). It is to be checked by a Project Time Manager, appointed by the Employer to ensure that the time-control requirements of the Contract are complied with, and is to be independently audited from time to time. It is not to be provided on paper, but is to be distributed transparently to all those who need to see it, in editable format in the software in which it was created so that it can be properly interrogated and understood.

**Recording progress**

No other standard form currently available requires the Contractor to keep anything other than those records in support of a claim (if requested), and some do not even require that. However, as with the Working Schedule, CPC2013 is prescriptive. Progress Records are to be prepared in a database in accordance with a default specification contained in Contract Appendix E, to be regularly submitted for acceptance and to conform to the recommendations of the Guide. The Progress Records are also to be checked by the Project Time Manager for compliance and, again, are to be independently audited from time to time and distributed transparently, in the database in which they are kept so that the records can be easily sorted, filtered, interrogated, checked and compared.

**Quality control**

Any schedule that is wrapped up in date constraints, float constraints, negative lag, open ends and other logic destroying techniques cannot be used for time management. It is obvious from experience of using other standard forms, that without adequate control of quality of schedules and records and effective sanctions for non-compliance, even the most thorough specifications are unlikely to be properly implemented and can become useless.

CPC2013 has approached this problem holistically; on the one hand there are detailed specifications of performance and quality, compliance with which can be ascertained. Secondly, compliance provides the Contractor with the benefit of a management tool of unrivalled quality to reduce its risk. It improves the Contractor’s efficiency and lowers its

\(^7\) [http://www.ciobstore.com/Product.asp?PID=6237](http://www.ciobstore.com/Product.asp?PID=6237)
exposure by ensuring fast and seamless payment for all work done and any loss and/or expense. If the relevant terms are not complied with, the Contract provides the Employer with an alternative means of controlling its risk, and finally, the Contract makes it plain that there are likely to be cost consequences for non-compliance.

If the Contractor refuses or neglects to properly plan and schedule the works or to keep proper records of resources used and work done, the Employer and its management team cannot effectively plan and schedule the Works in the Contractor’s place. However, under CPC2013, a failure to produce a contractually-compliant submittal, or a failure to disclose the Progress Records of the resources and productivity achieved may properly lead to a series of unwelcome consequences:

- the Contractor may not start the works until compliant management information is published
- when the work is underway, the Contract Administrator may instruct the Contractor to cease work (at the Contractor’s risk as to time and cost) until compliant management information is provided
- there will be foreseeable difficulties for the Contractor in obtaining payment for work done as the Working Schedule, Planning Method Statement and Progress Records are at the root of the interim payment mechanism and, without them, the Contract Administrator will necessarily be hampered in formulating promptly an accurate notice of payment due, or gauging the accuracy of the Contractor’s Notice of Payment Due
- because the Working Schedule, Planning Method Statement and Progress Records are at the root of the time and cost adjustment mechanism, in the event of excusable/compensable delay there will be foreseeable difficulties for the Contractor in obtaining an extension of time or time-related compensation
- the Contractor is not entitled to be paid for the provision of management information which it has either not competently prepared, or not published as required
- the Employer may employ others (at the Contractor’s expense) to investigate, record the resources, productivity and sequence of work achieved and to provide any schedule of anything carried out upon which the Contractor has not provided Contractually compliant information, and finally,
- the Contractor’s employment may be terminated for default.

Schedule revision

The key to using a predictive time model is in keeping it relevant. A static schedule that is never changed is useless for managing all but the simplest of sequential projects. Nor is it any use monitoring against a static schedule until it is shown to have been missed by too much to be useful and then, by creating another static schedule, doing the same thing all over again. To be of any use in the management of time and risk the schedule must be dynamic, that is it must be able to predict the consequence of change.
The schedule must be capable of accommodating the effect of better information, as it becomes available. In complex projects it is rarely possible to have all the design completed, once and for all, before the job starts on site. The effect of prime cost, provisional and contingency sums on time and the re-measurement of approximate quantities for example, must be taken into account if their effect on the future conduct of the works is to be effectively managed.

In addition to better information about design, better information about resources and productivity will also be obtained, as specialist subcontractors are appointed and they approach the commencement of their work. That must also be embodied in the schedule if the consequence of the change from inspired guesswork, to estimate, to evidence is to be taken into account, as it must if the predictions of the Schedule are to be meaningful.

Rarely do Contractors voluntarily embody the effects of their short term planning in their master schedule and the consequences of this failure are evident in virtually every dispute about delay. Typically, the Contractor will keep a master schedule based upon activity-related logic for public view and then create a number of independent short-term look-ahead schedules based upon resource and location logic to work from, which nobody else sees. When its work is interrupted, it is the resource schedule that is impacted by the stopped or slowed work in a particular location, but that is not evident from the publicly available master schedule, and dispute becomes inevitable.

CPC2013 addresses this by requiring the Working Schedule to be in three densities, low density for work not expected to be carried out for 9 months or more; medium density for work intended to be carried out between 4 and 9 months into the future; and high density for work planned to be executed in the next three months. Low density, long term planning must be estimated, often on the basis of experience of what is likely. In many cases the long-term work will not have been fully designed and subcontractors not engaged. It is really just guess work and it is at this level that Monte-Carlo simulation can be usefully employed to arrive at appropriate time contingencies for unquantifiable risks.

At medium density, the work must be designed in detail, subcontractors may have been engaged but the resources they will make available may not be committed. Time allowances, sequence and so on may be better thought out but will still be estimated. Time contingencies where required should be fewer but may be more accurately estimated and allocated against identifiable risks.

At high density, there is much less room for estimation or guesswork. The resources to be made available and the productivity they can be expected to achieve must be known and hence the duration of their activities can be calculated instead of estimated. Equally important is the shift from activity-logic at medium and low density to resource-logic at high density. That must also be taken into account as the Working Schedule is revised so that when the work comes to be carried out, the work of each resource is properly planned and the consequences of that planning, or interruption to it can be calculated.
The next article in this series will address how CPC2013 deals with the effect of interrupted progress and the management of risk.

About the Author

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Keith Pickavance first qualified as an architect in 1972 and then in 1978 obtained a law degree. After 20 years as an architect in private practice the last 10 years of which also involved construction management, dispute resolution and expert witness services, in 1993 he joined an American company specialising in forensic services and delay analysis. In 1996 he set up on his own again specialising in delay analysis and time management in London and Hong Kong. That practice was acquired by Hill International in 2006, an international construction management and claims consultancy with which he is now appointed an Executive Consultant.

He is a Past President of the Chartered Institute of Building and has led the CIOB’s time management initiative since its inception in 2007.

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