



**New South Wales Government
Procurement System for Construction**

Procurement Practice Guide

**Estimating contract times
(for construction projects)**

July 2008

Important notices

Current version

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<http://www.nswprocurement.com.au/Procurement-System-for-Construction/Reference-material/Procurement-practice-guides.aspx>

Amendments

Refer to the Procurement Practice Guide Amendments Log which is available on the Internet at:

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Estimating contract times (for construction projects)

Contents

	Estimating contract times (for construction projects)	1
1	Introduction.....	1
2	Factors affecting construction times	1
	2.1 Location.....	1
	2.2 Design aspects.....	1
	2.3 Management plans and asset management information	2
	2.4 Site.....	2
	2.5 Staged construction	2
	2.6 Market conditions.....	2
	2.7 Unforeseen circumstances	2
3	Additional factors affecting contract times	3
	3.1 General	3
	3.2 Risk allocation in contracts.....	3
	3.3 Alteration of risk allocation	3
	3.4 DD&C and D&C contracts	4
4	Time/Cost Graph (developed design contracts).....	4
5	Predicting construction times	5

Estimating contract times (for construction projects)

1 Introduction

This Procurement Practice Guide is intended to assist in determining appropriate contract times for construction contracts.

Historic data indicates that there is a large scatter in the times required to complete construction contracts. The time required to complete a contract depends on many factors, including:

- the skills and management systems of the contractor;
- establishment/disestablishment times required, including preparing management plans and asset management information;
- the weather;
- site conditions;
- site access;
- industrial issues;
- the complexity of the work;
- the geographical location of the site;
- the state of the market (which affects the availability of resources);
- the standard of documents provided to and by the contractor;
- the number, magnitude and timing of variations instructed by the Principal.

Projects that involve unique designs, critical timeframes or unusual problems such as complex foundations, difficult access or a remote location, should be analysed by appropriate experts to identify reasonable contract periods. Expert analysis can ensure the contract periods set are achievable and not likely to result in undue cost premiums.

2 Factors affecting construction times

2.1 Location

Construction projects can be susceptible to delays because of their locations.

Projects in the metropolitan area will have access to a greater volume and diversity of resources, so there will be less lead time and less lost time in bringing those resources onto the site. It may therefore be easier to maintain or accelerate progress.

Projects in the Central Business District may have slightly longer construction times because of access difficulties, and a propensity on occasion for increased industrial activity. Projects in remote areas can be affected by difficulties in obtaining suitable resources.

2.2 Design aspects

Projects that are unique, such as the refurbishment of culturally significant buildings, may require special construction techniques, more skilled resources and greater attention to detail. This may require more time.

Industrial buildings, and other simple purpose-designed buildings or building elements, may be substantially fabricated off-site in production plants, in parallel with other on-site work, allowing significant overall time savings. Examples of this are steel frames for buildings, pre-cast wall panels and prefabricated building.

High rise or multi-story buildings may, for a given total floor area, take longer to construct than low rise structures, given the extra access difficulties.

Civil construction work is more likely to be affected by weather conditions than building work. Once a building is roofed, it can provide for work to continue during adverse weather conditions, obviating some of the normal weather related delays.

2.3 Management plans and asset management information

Most contracts require the contractor to prepare and implement management plans prior to commencing some aspects of the work. These may include plans for managing occupational health and safety, environmental matters, industrial relations and quality management. The requirement to prepare plans may involve lead times before design or construction work can commence. In some circumstances it may be possible to complete the plans in parallel with other site establishment or design activities.

Sometimes the contractor is required to provide asset management information (including, for example, work-as-executed drawings or operation and maintenance manuals) to the Principal following commissioning of the asset. This may increase the overall time required to complete the contract, or it may be possible to complete it in parallel with other disestablishment work.

2.4 Site

The condition of the site will affect the time needed for preparatory site works to be completed before construction of the building or other structures can commence. Some factors that may increase construction times are:

- extensive site profiling,
- proximity to adjacent buildings,
- a requirement for pile foundations,
- rock excavation,
- demolition work prior to construction,
- a high water table,
- development approval conditions such as restrictions on work hours, noise and delivery times for material,
- difficult access to the site,
- relocation or deviation of services,
- archaeological, heritage or hazardous materials survey requirements.

2.5 Staged construction

Contracts that involve sequential construction of built elements will take longer than similar-sized projects where the various elements can be constructed concurrently. The total time for a staged project will be the sum of the periods required for the individual components.

2.6 Market conditions

Market conditions affect not only the cost of projects, but also the time required. In times of high demand for service providers, the contractor may experience difficulty in obtaining good quality subcontractors. Similarly, it may be difficult to obtain labour, materials and plant. All these factors can result in longer construction times.

2.7 Unforeseen circumstances

Construction times can be affected by circumstances that arise during the course of the work. Delays can be caused, for example, by:

- wet weather,
- industry-wide industrial conditions,
- variations to the work,

- changes to statutory requirements,
- unanticipated site conditions such as subsurface conditions, hazardous materials or unidentified services.

3 Additional factors affecting contract times

3.1 General

Contract completion times are generally expressed in weeks, with a completion date being calculated on the basis of that number of weeks after the date the contract is awarded.

Standard form contracts provided through the NSW Government *Procurement System for Construction* normally provide for working days to be Monday to Friday. If a contractor worked for five days each week, there would be 260 days of work during a year. However, the contract completion time includes all rostered days off (13 per annum), public holidays (10 per annum), annual holidays, and other leave occurring in the period of the contract. In a full calendar year these total about 40 working days.

Such 'lost' time can be a very important consideration in setting contract completion times for short duration projects (of less than a year). A large amount of lost time (up to 20 days) occurs at the traditional Christmas close down period. This lost time affects contractors, subcontractors and their suppliers. The times needed for short duration contracts can vary markedly, simply due to the time of year.

In setting contract completion times, the aim is to provide a time that is adequate for an efficient builder to complete the work within normal working hours using a reasonable level of resources.

3.2 Risk allocation in contracts

Under a construction contract, the risks of delays due to unforeseen circumstances such as wet weather or unanticipated adverse site conditions may either be retained by the Principal or be allocated to the contractor. If risks are allocated to the contractor, then the contract time should include a suitable allowance. If the Principal accepts the risks for certain specified unforeseen circumstances and makes provision in the contract to extend the time for completion if they occur, then the contract time initially specified can be shorter.

Construction contracts normally allow to extend time where there are delays arising from:

- inclement weather; or
- industrial disputes of an industry wide nature.

Contract times do not usually allow for such delays.

Where the contract transfers the risk of latent conditions or the risk of ambiguities in the Principal's design to the contractor, this should be taken into account in determining the specified contract time.

3.3 Alteration of risk allocation

The standard form contracts maintained under the NSW Government *Procurement System for Construction* contain standard risk allocation regimes, but provision is also included to alter some of this risk allocation under certain circumstances, to suit the specific project requirements. For example, if meeting completion time targets is critical, a contractor may be required to take the risk of wet weather delays, perhaps up to a certain maximum number.

If the standard risk allocation provisions are amended in a particular contract, this should be taken into account in determining the contract time.

3.4 DD&C and D&C contracts

Where the contract work includes design and/or documentation, allowance should be made in setting the contract completion time.

A contractor engaged under a DD&C contract needs additional time for the preparation of detailed design documents. A D&C contract requires additional time for the preparation of the concept design as well.

It is possible for a contractor to offset the additional design time in part by compressing or overlapping design and construction activities. For example, a contractor has the ability to commence site works before all design details are finalised. There is also less risk of delays through incomplete documentation or disputes over the interpretation of documentation, since the contractor is responsible for design development, documentation and construction.

For a DD&C or D&C contract, the contract completion time may not need to be as long as the time that would be required to complete the design and documentation and engage a contractor to construct the work under a developed design contract. For example, for a routine school project, the recommended contract time for a DD&C contract is 6 weeks longer than for the same project constructed using a developed design contract.

A further consideration is whether the contractor is required to obtain approvals from regulatory authorities. If this is a requirement, then additional time should be allowed in the contract period.

4 Time/Cost Graph (developed design contracts)

A Time/Cost Graph can provide a means of estimating an appropriate contract period for a construction contract, based on the estimated contract value.

An example of a Time/Cost Graph is included below. It applies to developed design contracts, where the contract is awarded after design is completed and the contractor is not required to obtain approvals from statutory authorities.

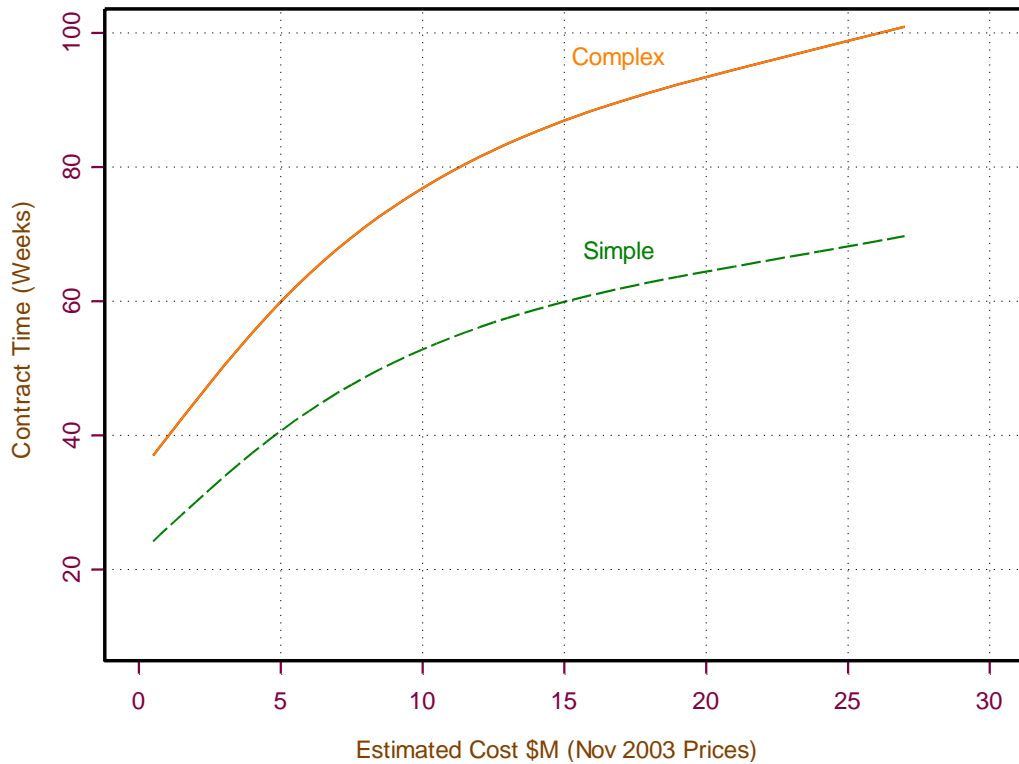
The lower line on the graph (labelled 'simple') indicates appropriate contract times for developed design contracts for routine projects that do not involve complex technology or difficult sites, where it is assumed the contractor will be experienced with similar projects. The upper line on the graph (labelled 'complex') assumes complex design, difficult construction and unfamiliar technology. Neither allows for wet weather, latent conditions or Principal caused delays such as variations instructed during the course of the work.

The user of the graph must evaluate the particular project and choose an appropriate level of complexity within the bandwidth.

Most building works of the developed design type that are undertaken by NSW Government agencies will fall into the lower range of the bandwidth. For standard primary schools, for example, adopting the lower line would be appropriate providing the project had no special factors (such as site difficulties) that would increase the time required.

The contract time derived from this graph must be adjusted up or down to allow for factors influencing construction time and contract time, including those outlined above.

Figure 1. Contract Time / Cost Graph



5 Predicting construction times

Because of the factors outlined in section 3 above, the construction time predicted for the purpose of managing the project will be greater than the contract time set in the contract.

In the early stages of the project, for planning purposes, it would be reasonable to allow a construction time that is 25% - 40% more than the anticipated contract time.