

NEC3 ECC target contract option – principles and innovative applications

INTRODUCTION

ISO 6707-2, *Building and civil engineering – Vocabulary – Part 2: Contract terms*, defines a target cost contract as “a cost reimbursement contract in which a preliminary target cost is estimated and on completion of the work the difference between the target cost and the actual cost is apportioned between the client and the contractor on an agreed basis.”

A target contract is accordingly:

- a cost-based contract whereby productivity is controlled by means of a target price; and
- a contract in which the financial risks are shared by the employer and the contractor in agreed proportions.

In a target contract, the employer and the contractor need to agree on (Watermeyer 2009):

- the target;
- how to pay the contractor for work done;
- how to adjust the target to compensate the contractor for changes in the scope and timing of the works, the failure by the employer to act timeously in accordance with the provisions of the contract, encountering physical conditions which are considered unlikely to have been foreseen, etc;
- how to deal with price inflation, i.e. include it in the target or adjust the target for price inflation;
- how to incentivise the contractor to propose changes to the scope which can result in financial savings; and
- how to share any savings or overruns.

UNPACKING THE NEC3 ECC TARGET CONTRACT

Concept

The NEC3 Engineering and Construction Contract (NEC3 ECC), one of the standard forms of contract within a family of contracts which embody a unique, collaborative and cooperative

Dr Ron Watermeyer
SAICE 2004 President
Infrastructure Options
watermeyer@ioptions.co.za



The NEC3 Engineering and Construction Contract (NEC3 ECC), one of the standard forms of contract within a family of contracts which embody a unique, collaborative and cooperative approach to project management, makes provision for two types of target contracts. One of the target contract options is based on an Activity Schedule (Option C) and the other is based on a Bill of Quantities (Option D).

approach to project management, published by Thomas Telford Ltd (the commercial arm of the Institution of Civil Engineers), makes provision for two types of target contracts. One of the target contract options is based on an Activity Schedule (Option C) and the other is based on a Bill of Quantities (Option D). Figure 1 illustrates the NEC3 ECC approach to a target contract.

A target (total of the Prices) is agreed between the Employer and the Contractor. The initial target is adjusted for compensation events (e.g. changes to the Works Information and events which are identified in the conditions of contract as being at the Employer's risk), except those associated with changes to the Works Information proposed by the Contractor, and which are accepted by the Employer, throughout the contract to arrive at a final 'cost' so that the target remains equitable. The Contractor is paid his costs, profit and overheads on a monthly basis as the work proceeds, i.e. his Defined Cost uplifted by the Fee. The difference between the 'final cost' and the amount paid to the Contractor (Defined Cost uplifted by the Fee) when the work is completed (i.e. at Completion) is shared between the Employer and the Contractor in agreed proportions.

Target contract options

The NEC3 ECC defines the Prices for the two target contract options as follows:

- Option C (Target contract with activity schedule): the lump sum prices for each of the activities on the Activity Schedule unless later changed in accordance with the contract.
- Option D (Target contract with bill of quantities): the Prices are the lump sums and the amounts obtained by multiplying the rates by the quantities for the items in the Bill of Quantities.

The NEC3 ECC does not explicitly define an Activity Schedule. It effectively defines an activity schedule as a document which is identified in the Contract Data unless later changed in accordance with the contract (clause 11.2(20)). What it does say is that (Watermeyer 2014):

1. Information in the Activity Schedule is not Works Information or Site Information (clause 54.1).
2. The Contractor provides information which shows how each activity on the Activity Schedule relates to the operations on each programme which he submits for acceptance (clause 31.4).
3. The Prices are the lump sum prices for each of the activities in the Activity Schedule unless later changed in accordance with this contract (clause 11.2(30)).
4. If the Contractor changes a planned method of working at his discretion so that the activities on the Activity Schedule do not relate to the operations on the Accepted Programme, he submits a revision of the Activity Schedule to the Project Manager for acceptance (clause 54.2).
5. Assessments for changed Prices for compensation events are in the form of changes to the Activity Schedule (clause 63.12).

Accordingly, an Activity Schedule as a minimum comprises a list of activities, which may be grouped together or listed on their own, with an amount entered against each activity linked to the Accepted Programme.

A Bill of Quantities is defined in the NEC3 ECC as a document included in the contract, which is changed in accordance with the contract to accommodate compensation events and for accepted quotations or accelerations. The NEC3 ECC anticipates that a Bill of Quantities is prepared in accordance with a

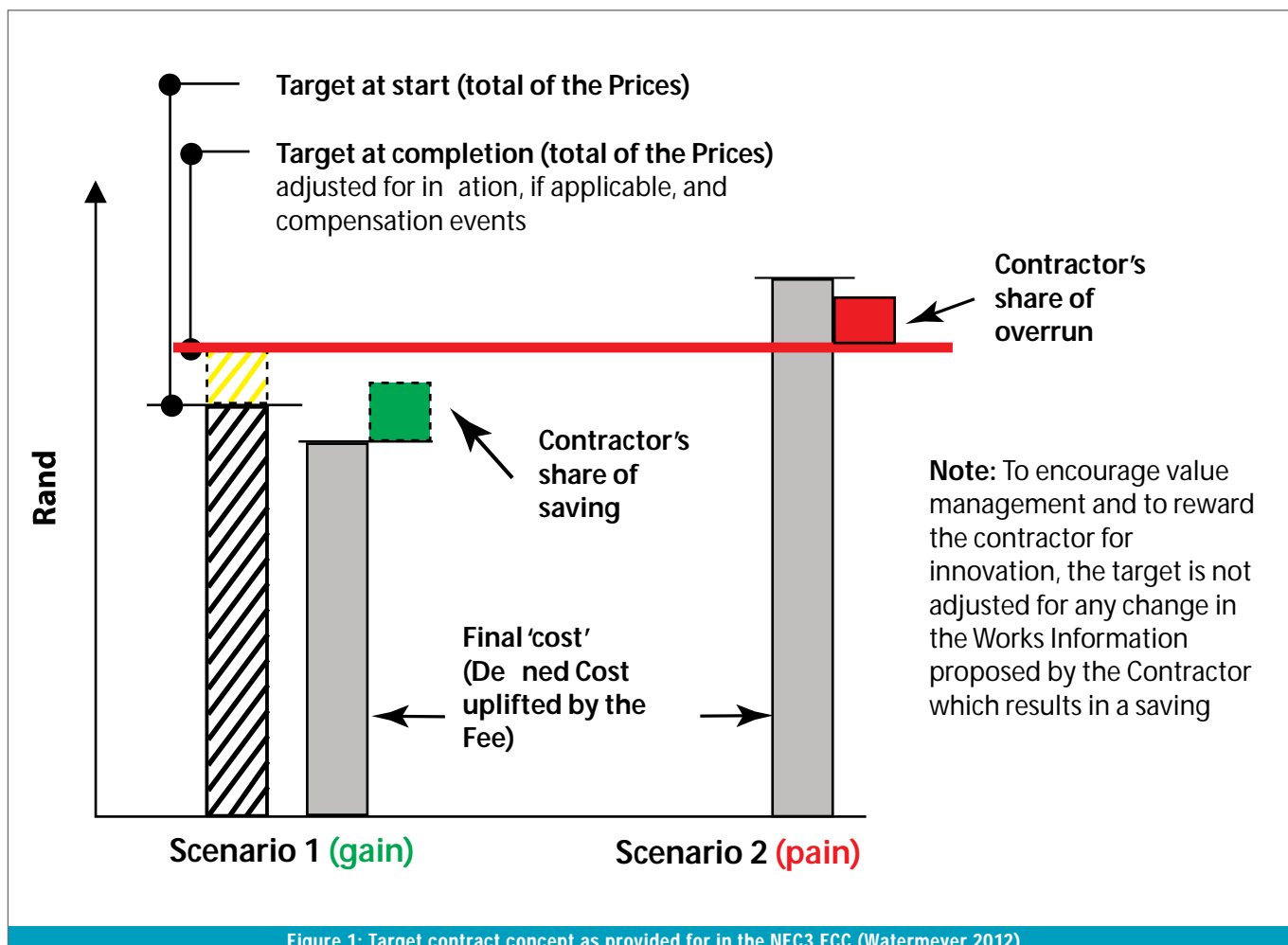


Figure 1: Target contract concept as provided for in the NEC3 ECC (Watermeyer 2012)

standard system of measurement which comprises rules for item descriptions and for the division of the work into items.

The total of the Prices at the commencement of a contract or package order issued in terms of a framework contract (see Watermeyer 2012) is the target which is derived from an Activity Schedule or a Bill of Quantities. These documents are not used to pay Contractors at regular intervals. They are merely used to:

- adjust the total of Prices (target) when compensation events occur, when quotations for acceleration are accepted or for the effects of inflation; and
- calculate the Contractor's share after Completion, i.e. the share of the difference between the total of Prices derived from an Activity Schedule or a Bill of Quantities and the Price for Work Done to Date (Defined Cost plus the Fee).

Compensation events are based on Defined Cost uplifted by the Fee and result in a change to the Activity Schedule / Bill of Quantities, and hence the total of the Prices (i.e. the target). The purpose of the Activity Schedule / Bill of Quantities is to understand the makeup of the Price when assessing compensation events. The total of Prices as set out in the Activity Schedule / Bill of Quantities only comes into play when the pain/gain share is evaluated after Completion.

Option D has two fundamental downsides. Firstly, the target will be a running total as it depends on the quantity of work done. Secondly, the Project Manager not only has to certify payment based on Defined Cost plus the Fee, but also has to measure the works in order to understand the shifts in the total of Prices, i.e. the target.

Option C has the advantage that the Activity Schedule allows earned value (the value of the work performed expressed in terms of the budget assigned to that work) and planned value (the authorised budget assigned to the scheduled work to be accomplished) to be monitored against the Prices for Work Done to Date (Defined Cost uplifted by the Fee). This enables projects to be more tightly managed.

The Prices for Work Done to Date

The Prices for Work Done to Date under Options C and D are defined as the "*total Defined Cost which the Project Manager forecasts will have been paid by the Contractor before the next assessment date plus the Fee*". Defined Cost is defined in the contract in terms of the amount of payments due to Subcontractors for work which is subcontracted and the cost of components in the Schedule of Cost Components for other work less Disallowed Cost. It should be noted that (see Watermeyer 2009):

- the Schedule of Cost Components is arranged under the headings People, Equipment, Plant and Materials, Charges, Manufacture and Fabrication, Design and Insurance;
- Defined Cost includes only amounts calculated using rates and percentages stated in the Contract Data, and other amounts at open market or competitively tendered prices with deductions for all discounts, rebates and taxes which can be recovered;
- the Fee includes the Contractor's profit and all costs which are not included in the Defined Cost, e.g. office overheads, finance charges, insurance premiums and the like;

- Disallowed Cost removes the notion of entitlement to all costs as they disallow costs incurred which are not justified, should not have been paid, were incurred due to oversights/faults by the Contractor, resources not used to provide the works, etc;
- the payments made to the Contractor each month are based on a Defined Cost uplifted by the Fee.

What does have a significant impact on the final amount paid is the quantum of the Fee as it impacts upon the Price for Work Done to Date, and the value of compensation events.

Compensation events

A compensation event is an event listed in the NEC3 ECC which, if it occurs, allows for changes in the contract price or time for completion or the attainment of a Key Date (the date by which work is to meet the condition stated in the Contract Data), provided that it does not arise from a fault of the Contractor. These events relate to actions attributable to the Project Manager, the Supervisor, the Employer or Others, changes in Works Information and events arising from external issues such as physical conditions which an experienced contractor would have judged as having such a small chance of occurring that it would have been unreasonable to have been allowed for, weather worse than the 1:10 year frequency, an Employer's risk event and the occurrence of "force majeure" type events. Where a Bill of Quantities is used, compensation events include mistakes which are departures from the rules contained in the method of measurement, ambiguities and inconsistencies in such documents, and shifts in total amounts for items which exceed 0.5% of the total of the Prices at the contract Date which are unrelated to changes in the Works Information.

The procedures for dealing with compensation events as provided for in the NEC3 ECC are summarised in Figure 2. The Contractor is free to dispute the actions of the Project Manager within four weeks of becoming aware of the action and refer the matter to the Adjudicator for resolution in terms of the contract.

Changes to the Prices are assessed as the "effect of the compensation event upon the actual Defined Cost of the work already done, the forecast Defined Cost of the work not yet done and the resulting Fee." The assessment for the compensation event includes risk allowances for cost and time matters which have a significant chance of occurring and are at the Contractor's risk under the contract.

A delay to a Completion Date is assessed as the length of time that, due to the compensation event, planned completion is later than planned Completion on the Accepted Programme. A delay to a Key Date is assessed as the length of time that, due to the compensation event, the planned date when the Condition stated for a Key Date will be met is later than the date shown on the Accepted Programme.

The assessment of compensation events is based on the assumption that the Contractor reacts competently and promptly to the compensation event, and that any Defined Cost and time due to the event are reasonably incurred. If the Project Manager decides that the effects of a compensation event are too uncertain to be forecast reasonably, he states assumptions about the event in his instruction to the Contractor to submit quotations. Assessment of the event is based on these assumptions. If any of them is later found to have been wrong, the Project Manager notifies a correction which allows the impact of the correction to be assessed as a compensation event.

Price adjustment for inflation

Price adjustment for inflation may be incorporated in an NEC3 ECC by including Secondary Option X1 in the Contract Data for target contracts. This introduces a Price Adjustment Factor which is the total of the products of each of the portions stated in the Contract Data multiplied by $(L-B)/B$ for the index linked to it, where B is the latest available index before the base date and L is the latest available index before the date of assessment of the amount due.

The Contractor without Secondary Option X1 shares the risk of price inflation in a target contract through the

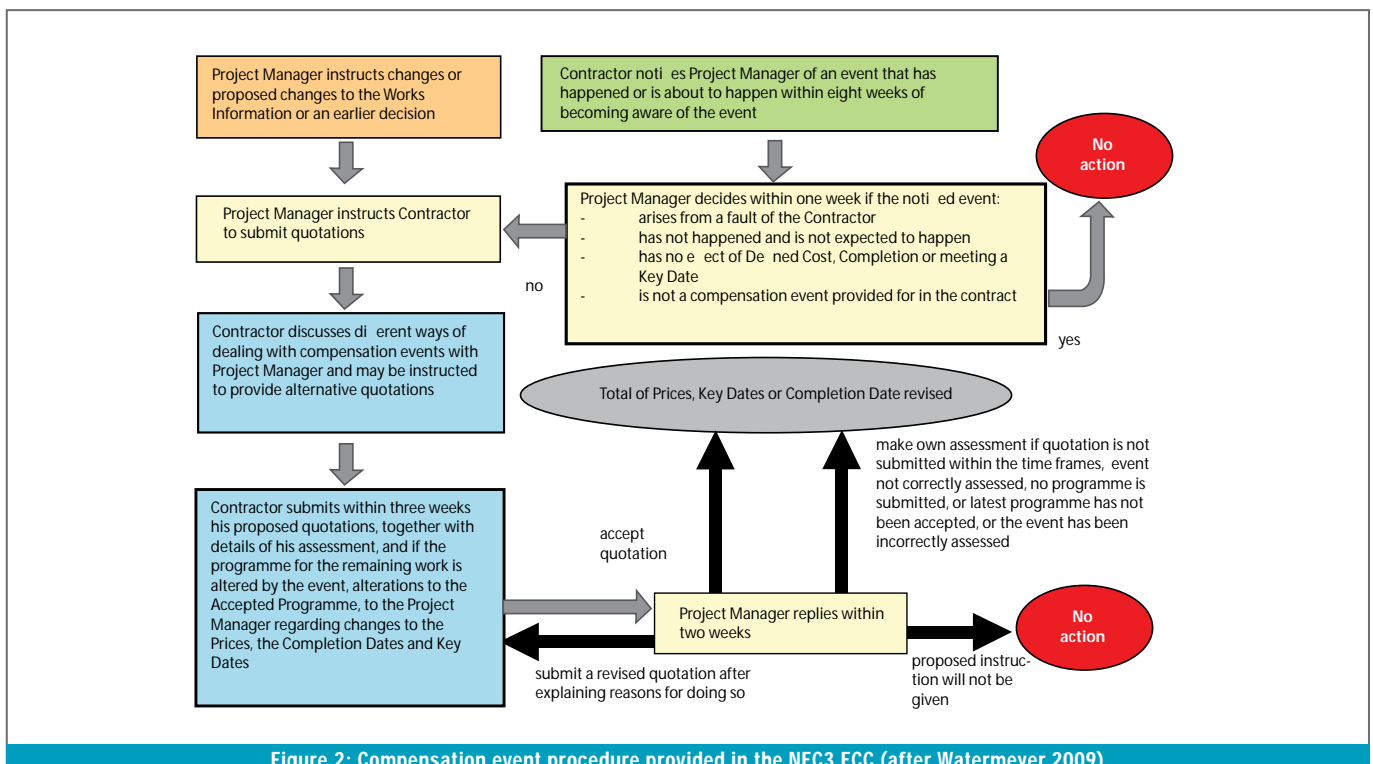


Figure 2: Compensation event procedure provided in the NEC3 ECC (after Watermeyer 2009)

Contractor's share of the difference between the total of Prices (target), which includes the Contractor's estimate of price inflation, and the Price for Work Done to Date which is assessed and finalised after Completion.

Where this Secondary Option is included in a contract, the total of Prices (target) needs to be adjusted only to enable the Contractor's share to be calculated as amounts due to the Contractor are based on Price for Work Done to Date (Defined Cost plus the Fee), i.e. current cost which automatically includes any inflation occurring since the base date. However, as the Contractor's share is calculated from the difference between the total of Prices and the Price for Work Done to Date, the two must be compatible in terms of an allowance for inflation. Accordingly, the amount added to the total of Prices for price adjustment each time an amount due is assessed is the sum of:

1. the change in Price for Work Done to Date (Defined Cost plus the Fee) since the last assessment multiplied by PAF/(1+PAF); and
2. correcting amounts which arise from changes to the indices for assessing previous amounts for price adjustment.

The Contractor also needs to base his quotations for compensation events on estimates of cost that are current at the base date. Accordingly, the "current costs" need to be reduced to the base date by dividing such costs by one plus the PAF and the rates for employees and Equipment stated in the Contract Data (i.e. base date rates) are applied when assessing such events.

INNOVATIVE APPLICATIONS

Framework contracts

ISO 10845-1 defines a framework agreement as *an agreement between an employer and one or more contractors, the purpose of which is to establish the terms governing contracts to be awarded during a given period, in particular with regard to price and, where appropriate, the quantity envisaged*. Framework agreements enable an employer to procure works on an instructed basis (call off) over a term without any commitment to the quantum of work instructed in the absence of a fully developed scope of work.

The NEC3 ECC can be converted into a framework contract by simply introducing a Z clause modelled along the lines of secondary option X17 (Task Order) contained in the NEC3 Term Services Contract (Watermeyer 2013). The Contract Data that is entered into using an NEC3 ECC can then make reference to Package Orders which are to be issued in terms of the aforementioned Z clause during the term of the contract. Package Orders can in this manner be issued through the standard NEC3 ECC. Accordingly the NEC3 ECC becomes a framework contract which sets out the generic terms, conditions and Works Information for the "call offs" over the term, and the Package Orders contain the Package specific data and information. The "contract" for a Work Package is therefore the Package Order read together with the NEC3 ECC contract that is entered into.

The total of the Prices for a Package Order is the target price. The target price can be tendered for the first Package Order.

Target prices for subsequent packages can be negotiated when there is sufficient production information (information enabling either construction or the production of manufacturing and installation information for construction) available to do so.

Early contractor involvement

Research has indicated that, in order to provide higher value and less waste, the fragmentation in design needs to be addressed, preferably before 25% of the design is complete. Target cost contracts can be used to facilitate early contractor involvement to obtain a benefit of the contractor's expertise as a constructor in terms of the design by employer, develop and construct, and design and construct contracting strategies. This is possible as contractors can be contracted on the basis of their cost parameters (Defined Cost plus the Fee) and a target price can be negotiated when there is sufficient production information available to agree a target price.

Approach to setting and adjusting incremental targets to "fast track" construction

The Works Information needs to be complete in order to develop and price an Activity Schedule or a Bill of Quantities. This is not always possible. As a result, certain pricing assumptions may need to be made regarding allowances for items or budgetary items. When the production information for such items is completed, the Work Information is changed in accordance with the provisions of the contract. A change in Works Information triggers a compensation event which then allows the total of the Prices, the time for Completion and Key Dates to be changed in accordance with the provisions of the contract (see Figure 3).

Accordingly, a Contractor can be provided with a description for the whole of the works which he is ultimately to provide. He can, prior to commencing the works, be required to programme the whole of the works and to only price a portion of the works where the production information is complete. An assumption can then be made as to what allowance should be made for the

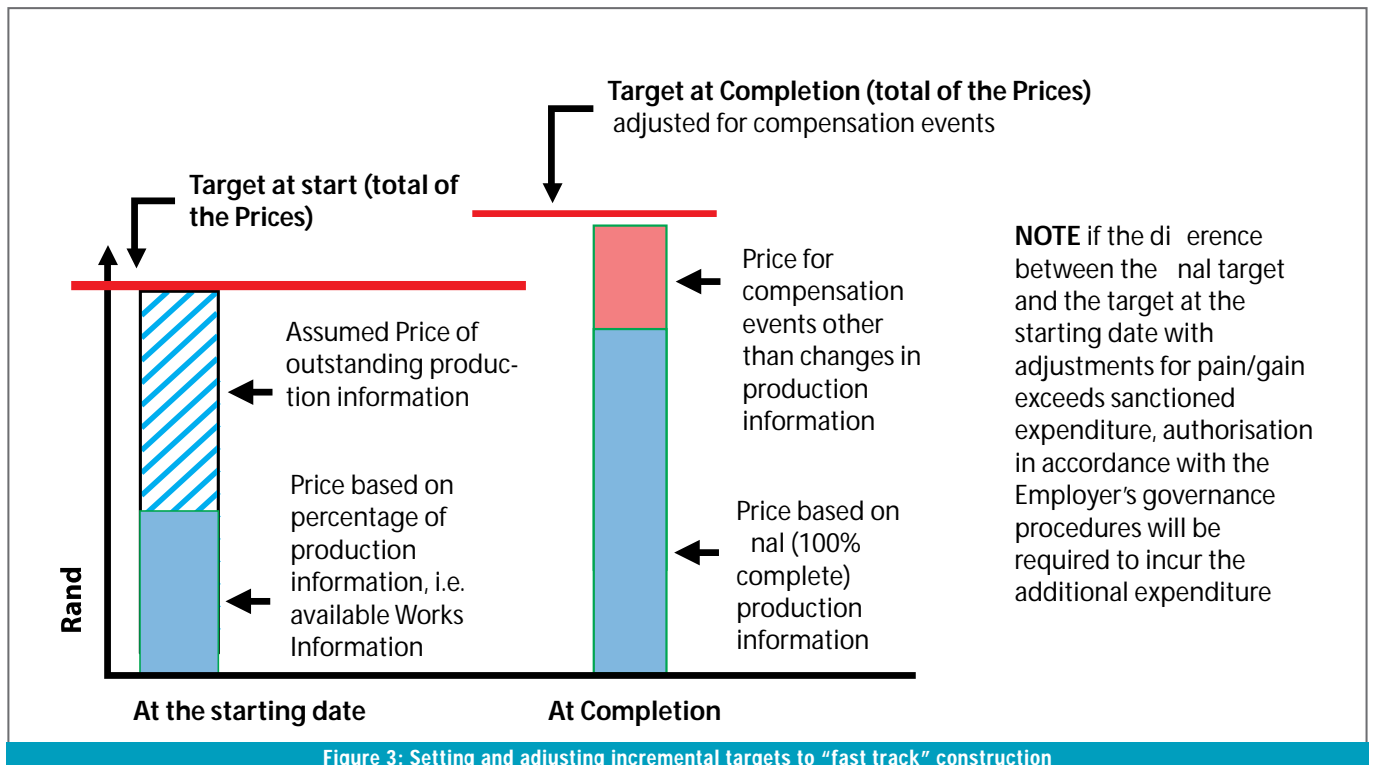
balance of the works for which production information is not yet available. These assumptions can be revisited as and when new production information is available and adjustments to the target, the date for Completion and Key Dates can be made. The accuracy of the assumptions made can be improved upon should they be developed with contractor insights.

The increasing of the target price to reflect the outcomes of a compensation event is provided for in the contract. What is not provided for in the contract is the authorisation for those administering the contract to incur expenditure above the Employer's authorised limit, e.g. the initial target price adjusted for price inflations plus a percentage or sanctioned contingency amount. Such authorisation needs to be obtained in order to effect payment to the Contractor, failing which interest may be applied to all payment certificates until such time that payment is made.

A CASE STUDY

The University of the Witwatersrand's Undergraduate Science Centre (UGSC) project involved the conversion of the western grandstand of the historic former agricultural showground of the Rand Easter Show on the West Campus into large teaching auditoria linked to a new three-storey laboratory building to accommodate approximately 3 500 students at any one time. This project involved the construction of three laboratories (chemistry, physics and biology) with a total of 1 100 bench spaces, all with supporting services, storage and preparation facilities; five large lecture venues accommodating 1 570 students with capacity ranging from 250 seats to 450 seats; and 20 tutorial rooms providing a total capacity for 830 students.

The cost estimate upon completion of the concept/preliminary design inclusive of contingencies, cost escalation, professional fees and VAT was R204 million. The university, however, only had R178 million available for the project. A framework contractor, appointed under the NEC3 ECC (Option C), was assigned to work with the university's design team with a view to delivering the pro-



ject within a control budget of R178 million. A cost model was developed between the cost consultants and the contractor following extensive value engineering which indicated that this was possible.

The UGSC had to be completed ahead of the start of the academic year. In order to fast track the project to meet the academic programme, the contractor was instructed to proceed with construction of the reinforced concrete frame with a target price of R41 million. The target was increased when the production information became available. The project was completed on time for an amount of R179 million. The contractor and the employer both enjoyed a small share gain as the project came in just under the target price.

REFERENCES

- Watermeyer, R B 2009. Getting to grips with the NEC3 ECC target contract with activity schedule. *Civil Engineering*, Vol 17(1): 26–33.
- Watermeyer, R B 2012. A framework for developing construction procurement strategy. *Proceedings of the Institution of Civil Engineers, Management, Procurement and Law*, Vol 165 (4): 223–237 (15).
- Watermeyer, R B 2013. Unpacking framework agreements for the delivery and maintenance of infrastructure. *Civil Engineering*, Vol 21 (1): 21–26.
- Watermeyer, R B 2014. NEC3 Engineering and Construction Contract: Activity Schedules. *Civil Engineering*, Vol 22(1): 28–31. ■

Research has indicated that, in order to provide higher value and less waste, the fragmentation in design needs to be addressed, preferably before 25% of the design is complete. Target cost contracts can be used to facilitate early contractor involvement to obtain a benefit of the contractor's expertise as a constructor in terms of the design by employer, develop and construct, and design and construct contracting strategies.