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Getting to grips with the NEC3 ECC target contract with activity schedule

INTRODUCTION

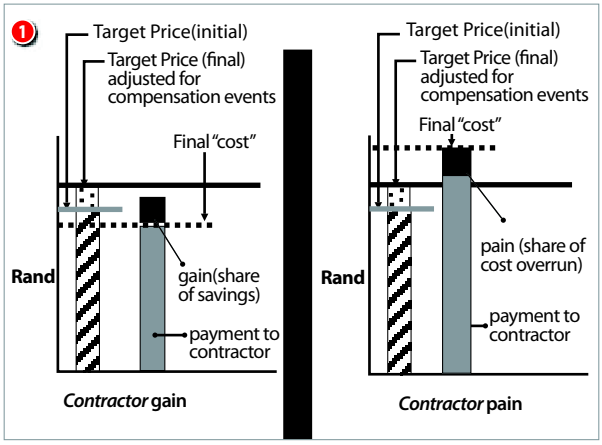
ISO 6707-2, Building and civil engineering – Vocabulary – Part 2: Contract terms, defines a target cost contract as *a cost reimbursement contract in which a preliminary target cost is estimated and on completion of the work the difference between the target cost and the actual cost is apportioned between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

A target contract is accordingly a 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:

- 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, price inflation, etc
- How to incentivise the contractor to propose changes to the scope which result in financial savings
- How to share any savings or overruns

Figure 1 illustrates the NEC3 Engineering and Construction Contract (ECC) target cost concept. A target price is agreed between the employer and the contractor to control productivity. The initial target price is adjusted for compensation events, except those associated with scope changes proposed by the contractor, throughout the contract to arrive at a final "cost" to keep the target equitable. The contractor is paid his costs, profit and overheads on a monthly basis as the work proceeds.



Note: In order to encourage value management and to reward the contractor for innovation, the target price is not adjusted for any change in scope proposed by the contractor which results in a saving

The difference between the "final cost" and the amount paid to the contractor when the work is completed is shared between the employer and contractor in agreed proportions.

The NEC3 ECC is the only standard form of contract endorsed for use in South Africa by the Construction Industry Development Board that has standard provisions for a target contract.

THE NEC APPROACH TO CONSTRUCTION WORKS

The NEC3 family of standard contracts is an integrated and multidiscipline set of contracts for engineering and construction projects. The family includes contracts for engineering and construction works, professional services, term services contracts and supplies. The family also includes back to back subcontracts for engineering and construction works.

The NEC3 contracts are designed to encourage collaboration and teamwork. They provide effective control of change, speedy agreement of time, quality and cost impacts of change, improved early forecasting of end costs, greater accuracy of end date forecasts, early warning of risks and potential change and quick dispute resolution mechanisms.

The key processes and procedures associated with the NEC typically relate to:

- Risk management (risk register)

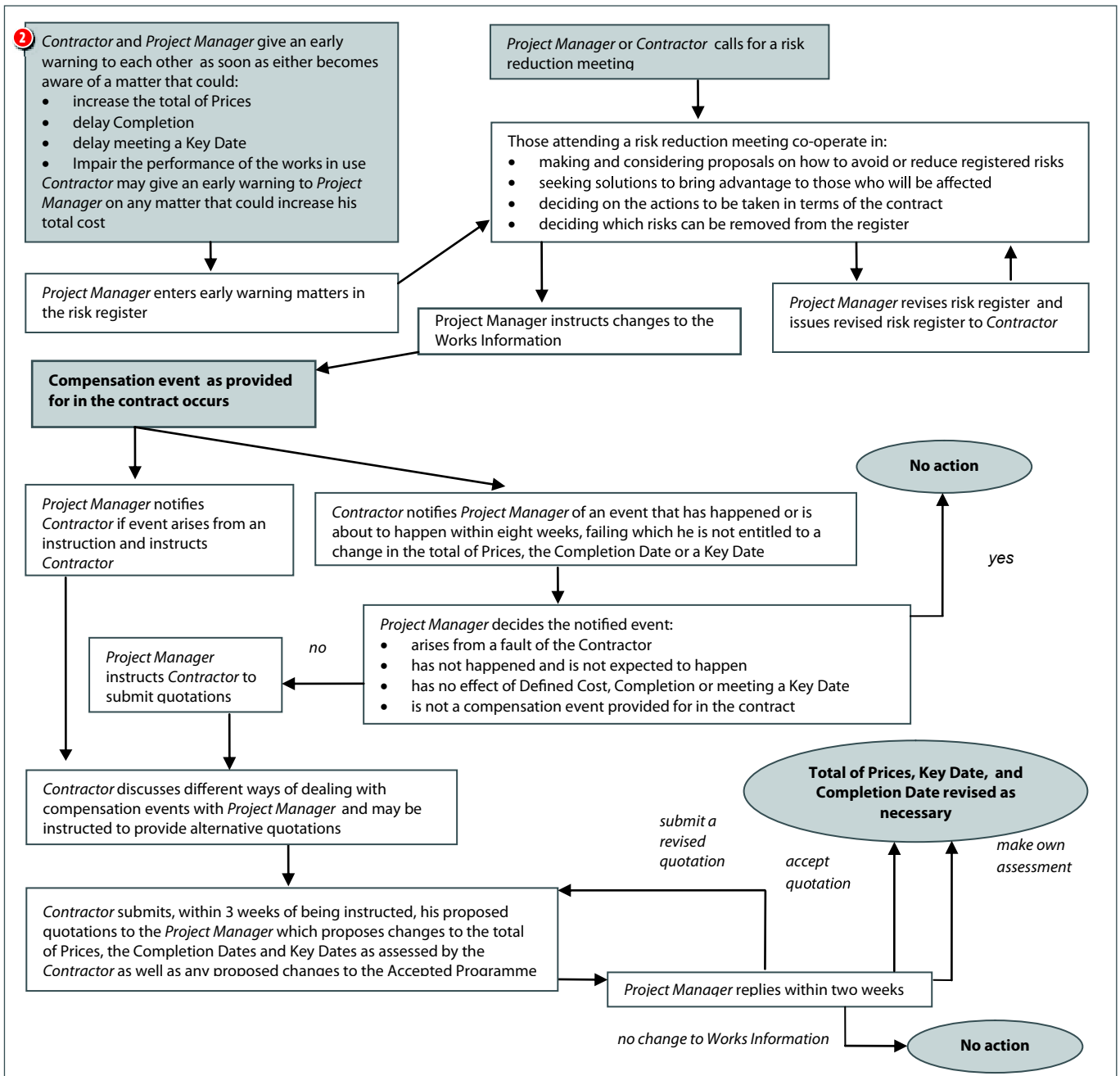
1 Figure 1: Target contract concept

- Time control (accepted programme)
- Change control (compensation events)
- Cost control (focus on out-turn cost)
- Acceleration
- Quality control (defects reporting and rectification)
- Standard reporting requirements
- Dispute resolution (adjudication)

The NEC3 Engineering and Construction Contract (ECC) promotes the idea of the pre-assessment of changes to the scope, timing of the work, etc, in the form of a quotation at the earliest possible time (see Figure 2). All changes at the risk of the employer are valued at defined cost plus the contractor's fee percentage with no reference to tendered rates or prices, the philosophy being that the contractor should not be in a better or worse position than before the change. This approach also allows alternative quotations to be called for and evaluated, and brings a contractor back to the same position that he would have been at the time of tender.

Variations such as scope changes, i.e. changes to the works information, are compensation events and are assessed on the basis of the forecasted effect on cost as defined in terms of the contract plus the contractor's fee percentage and any delay to the completion date. Accordingly any extension of time or expense (or both) is assessed within the

Figure 2: Risk and change management processes contained in the NEC Engineering and Construction Contract (ECC3)



Note: The NEC ECC3 contract makes an event notified to the *Project Manager* a compensation event if the *Project Manager* fails to make a decision. Likewise, a quotation is accepted should the *Project Manager* fail to make a decision on a quotation within the time period stated in the contract.
Any dispute arising from the abovementioned process is submitted to and settled by an adjudicator. Disputes may be submitted to an adjudicator not more than **eight weeks** after the party becomes aware of the action that triggers a dispute. The adjudicator provides his decision within **eight weeks** of receiving the first submission.

compensation event that caused the delay or expense.

NEC3 TARGET CONTRACT OPTION

Establishing the target price

The NEC3 ECC has two options for establishing the target price (total of prices) using either an activity schedule (Option C) or a bill of quantities (Option D). Both these methods allow the contractor to build up a price for the works, based on estimates for performing the work which may also include risk pricing. Activity schedules and bills of quantities are vehicles for creating the target and are also the breakdown of the contractor's tender to provide the basis for tender comparisons and tender assessments.

In the activity schedule option (Option C), the target price is the sum of lump sum prices for each of the activities on the activity schedule unless changed in accordance with the contract. The contractor is required to provide information which shows how each activity on the activity schedule relates to operations on the programme. This allows the project team (employer, contractor and project manager) to monitor the works in relation to the forecasted costs in the activity schedule with payments made in terms of the contract.

In the bill of quantities option (Option D), the target price is the sum of the lump sums and amounts obtained by multiplying the rates by the quantities for the items in the bill of quantities. In terms of this option, a difference between the final total quantity of work done and the quantities stated for an item in the bill of quantities is a compensation event if the differences do not arise from scope changes, the difference causes defined cost per unit of quantity to change, and the rate in the bill of quantities for the item multiplied by the final total quantity for work done is more than 0,5% of the total of prices at the contract date. Accordingly, the exact target prices are not known until the final total quantity of work done has been established and the compensation events associated with changes in quantities, if any, are resolved. Furthermore, the quantities are not directly related to activities on the programme, which makes it very difficult for the project team to monitor forecasted costs with payment made in terms of the contract.

The main difference between options C and D lies in the risk of errors in the pricing documents. Option D is seldom used and will not be discussed any further in this article.

Assessing cost in terms of the contract

Defined cost is:

- The amount of payments due to subcontractors for work which is subcontracted without taking account of amounts deducted for items such as retention and delay damages
- The cost of components in the Schedule of Cost Components for other work, less disallowed cost

Disallowed cost are costs which are not justified by the contractor's records and accounts, should not have been paid to subcontractors or suppliers, or occurred because the contractor failed to follow a procedure provided for in the contract or failed to give an early warning, and the cost of correction of defects after completion or those resulting from the contractor's failure to comply with a constraint on how to provide the works, resources not used to provide the works, and the preparation for an adjudication or tribunal. The correcting of defects, other than those relating to the failure to adhere to a prescribed method of working, prior to the completion of the works, is not a disallowed cost.

Defined cost is calculated using rates and percentages stated in the contract data and other amounts at open market or competitively tendered prices with deductions for discounts, rebates and taxes which can be recovered.

Defined cost is used to:

- Assess the value of compensation events (variations)
- Calculate the cost of the entire works for the purpose of assessing the payment due to the contractor
- Calculate the gain or pain share

Schedule of cost components

The Schedule of Cost Components (SCC) is the tool for calculating defined cost. It identifies the cost elements for:

- Non-subcontracted work within the working area (i.e. the areas or land comprising the site which are made available for use by the employer together with additional areas proposed by the contractor such as borrow pits and dedicated batch plant sites) for which the contractor will be reimbursed
- Assessing any changes in target price

Defined cost is calculated using rates and percentages stated in the contract data and other amounts at open market or competitively tendered prices with deductions for discounts, rebates and taxes which can be recovered

It facilitates the forecasting of cost as it allows the "build up" of costs to be developed in a transparent manner. It interacts with parameters relating to percentages, amounts and rates provided in the contract data.

Despite its name, the SCC is not a schedule of costs – it is merely a detailed list of items of cost broken down into the following sections:

1 People (people who are directly or indirectly employed by or are paid by the contractor and who work in the working areas)
2 Equipment (items provided by the contractor and used by him to provide the works and which the work information does not require him to include in the works, including consumables such as fuels, lubricants, shuttering materials, welding rods, etc)
3 Plant and materials (items intended to be included in the works less credits for disposals unless costs are disallowed)
4 Charges (payments for water, gas, electricity and public authorities in relation to the works, payment for cancellation charges relating to a compensation event, charges for consumables and equipment provided for the project manager's and supervisor's offices, as well as an overhead charge incurred within the working area to allow for cost recovery on items such as telephones, copying, sanitation facilities, catering, medical facilities, equipment, supplies and services for the contractor's offices and workshops, survey equipment, testing equipment, computers, hand tools other than those powered by compressed air, etc, applied to the cost of the people component)
5 Manufacturing and fabrication (items which are manufactured and fabricated outside of the working areas based on hourly rates and overhead costs to cover the costs of supervisors if not included in the hourly rates, rent, etc.) outside of the working areas
6 Design costs (hourly rates and overheads to cover the cost of the use of computers and software packages, office rental, phones, etc) outside of

Table 1 Differences between the Schedule of Cost Components and the Shorter Schedule of Cost Components

Component		Schedule of Cost Components (SCC)	Shorter Schedule of Cost Components (SSCC)
1	People		Amounts paid cover all the specific items listed in the full SCC. The contractor only justifies the amounts paid for people to simplify matters
2	Equipment	Equipment rates based on open market rates, rental rates or rates in contract data	Equipment rates based on percentage adjustment of listed prices or rates in contract data. Open market rates applied to items not covered by lists or contract data
3	Plant and Materials	No difference	
4	Charges	Separate payment for charges other than overhead costs incurred within working areas relating to the provision and use of equipment, supplies and services	Separate payment only for cancellation charges relating to a compensation event, payment to public authorities, and charges for consumables and equipment provided for the project manager's and supervisor's offices. All other charges are included in the people percentage overheads
5	Manufacture and fabrication	Hourly rates multiplied by hours worked plus a percentage for overheads	Amount paid by contractor (cost)
6	Design	No difference	
7	Insurance	No difference	

Table 2 Prices for work done to date

				Amount (Rand)		
Component		Total for component				
1	People	total A	R			
2	Equipment	total B	R			
3	Plant and Materials	total C	R			
4	Charges (including charge calculated by multiplying the total people costs by the percentage for working area overheads)	total D	R			
5	Manufacture and fabrication (including overheads)	total E	R			
6	Design (including overheads)	total F	R			
Total for schedule of cost components				R		
Less cost of events for which the contractor is required to insure and costs paid to the contractor by the insurers				R		
Less Disallowed cost				R		
Defined cost of other work					R	
Defined cost of subcontract work					R	
Total defined cost (Defined cost of other work + defined cost of subcontracted work)						R

Table 3 Fee Calculation

Component	Amount (Rand)	
Fee for defined cost of other work: = direct percentage fee stated in contract data / 100 x defined cost of other work = ……. / 100 x ……..	R	
Fee for subcontracted work: = subcontracted fee percentage stated in contract data / 100 x defined cost of subcontracted work = ……. / 100 x ……..	R	
Fee (Fee for defined cost of other work + fee for defined cost of subcontracted work)		R

Table 4 Target share percentages

Share range (Difference between target price and final "cost" (see Figure 1))	Contractor's share percentages			
	Example 1	Example 2	Example 3	Example 4
>120%	20%	15%	100%	100%
111 – 120	70%	75%	75%	100%
106 – 110	60%	70%	75%	100%
101 – 105	50%	50%	50%	100%
96 – 100	50%	45%	50%	50%
91 – 95	40%	30%	50%	50%
80 – 90	30%	15%	40%	40%
< 80%	20%	15%	30%	20%

the working areas

7 Insurance (deduction of costs of insured events and costs paid to the contractor by the insurers)

Whatever is not in the Schedule of Cost Components is treated as being included in the fee. Accordingly, profit, head office charges and overheads, finance charges, the cost of performance bonds, insurance premiums, head office staff, superintendence on subcontractors, etc, as relevant, are included in the fee. The fee must:

- Exclude the overheads which are recovered under the manufacture and fabrication and design components outside of the working area. Conversely, the overheads for these items must not include the contractor's overheads and profit
- Include the cost of people who are directly employed by the contractor in providing the works, whose normal place of work is outside of the working areas and are not included in the manufacture and fabrication and design components of the SCC, e.g. contracts director and staff who would not form part of the working areas daily labour records

The ECC provides for two different fees – a direct fee percentage which is applied to own work and a subcontract fee percentage which is applied to subcontracted work.

The principle underpinning the schedule is that an amount may be included only in one cost component and only if it is incurred in order to provide the works.

It may be appropriate in some contracts to amend the items in the SCC to accommodate specific requirements.

Shorter Schedule of Cost Components

The Shorter Schedule of Cost Components may be used to assess compensation events should the project manager and contractor agree, or where the project manager makes his own assessments. It is simpler to apply than the full Schedule of Cost Components and is suitable for assessing certain types of compensation events.

The differences between the Schedule of Cost Components and the Shorter Schedule of Cost Components are set out in Table 1.

Prices for work done to date

The price for work done to date is the total defined cost which the project manager forecasts will have been paid by the contractor before the next assessment date plus the fee.

The defined cost may be calculated or assessed by allocating the costs on the site to the appropriate heading in the Schedule of Cost Components and to summarise them as in Table 2.

The fee is calculated as in Table 3. The prices for work done to date are then the sum of the total defined cost plus the fee.

Pain or gain share

The difference between the target price (total of prices) and the price for work done to date is divided into increments. Unique target (pain or gain) share percentages can be assigned to each of these increments. The target share between the employer and the contractor varies the risk between one principally carried by the employer to one principally carried by the contractor, and to any stage in-between these extremes.

A number of target share approaches are illustrated in Table 4. The contractor's gain share percentages where the share range is less than 80% are typically low as contractors should not be incentivised to cut costs. In any event, the likelihood of reducing final "costs" to below 80% of the target prices is low.

The contractor's gain share percentages in the share range of between 90% and 100% are typically between 30% and 50%. This provides the contractor with a reasonable incentive to keep costs down and to apply value management principles in looking for

ways to change the works information in order to obtain better outcomes. A 100% contractor pain share percentage, where the share percentage exceeds 100%, creates a guaranteed maximum price (see Example 4 in Table 4). Such a percentage will cause the contractor to risk price when establishing his target price. Raising the guaranteed maximum price to a share range in excess of 120% (see Example 3) may soften the risk pricing around the target price.

On the other hand, the share percentages can be set to cause the contractor to lose his profit and some of his overheads on the works should the share range reach 120%, e.g. Example 1 will result in a "loss" of 5,5% and 12,5% should the share range reach 110% and 120%, respectively, while Example 2 will result in a "loss" of 6% and 12,5% for the same share ranges. The contractor share percentages in Examples 1 and 2 provide the contractor with an incentive to complete the work with the target price, but does not cause a contractor to carry major losses should the share range exceed 120% for any unforeseen reason.

ASSESSING THE FINANCIAL OFFER IN THE EVALUATION OF TENDERS

Tenderers are required in a target contract (option C) to tender:

- The total of prices derived from an activity schedule
- Parameters (percentages relating to fees, listed equipment prices, and fabrication and professional service overheads, and hourly rates for off-site fabrication and professional design services) which are applied in the schedule of cost components to assess compensation events and to make payments to the contractor

The manner in which tenders are to be reduced to a common basis for comparative purposes should be stated in the tender data and a tender assessment schedule included in the returnable schedules.

Where the target price is negotiated after the formation of the contract, when the scope of work is available, the tender assessment schedule should set out estimates of the costs and time usage that are likely to occur in the various cost components of both the SCC and the SSCC so that the tendered parameters can be applied in order to arrive at a total of prices for comparative purposes. Alternatively, a quantum of costs and time should be stated in the tender assessment schedule in the proportions that are likely to occur.

Where tenderers tender the total of prices derived from an activity schedule, the tender assessment schedule needs to combine the tendered total of prices with the impact of the tendered parameters on the contract. This can be done by applying the tendered percentages to representative portions of the total of prices and the tendered rates to time estimates, as relevant. This will result in the application of a percentage increase to the total of prices for comparative purposes to represent the impact of the tendered parameters.

Care must, however, be taken in ensuring that the fee percentages that are applied in the tender assessment schedule are comparable, as different tenderers may take different views regarding what is included in a percentage fee or overhead (see Figure 3). It is therefore advisable to request tenderers to provide a breakdown of their preliminary and general items and their percentage fees. Alternatively, the SCC should be modified to include or exclude specific items so that equitable comparisons can be made.

MONITORING A TARGET CONTRACT

Target contracts by their very nature require open book accounting. The ECC target contract requires the contractor to allow the project manager to inspect the

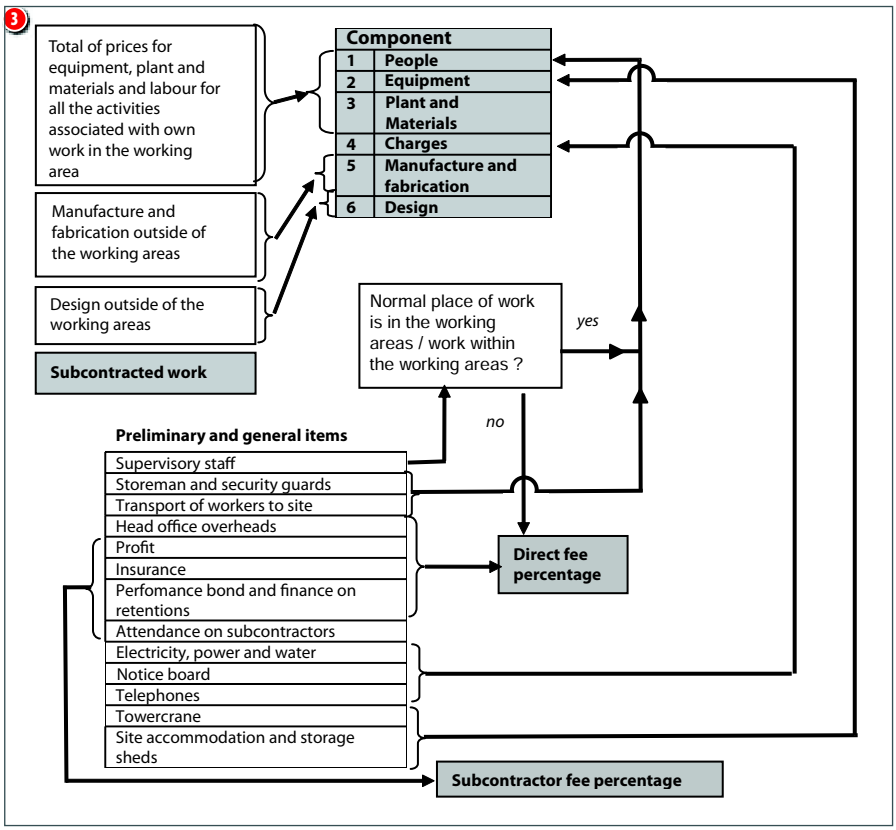


Table 5 Basic means of verifying costs

	Component	Means of verification items in the SCC
1	People	Payroll sheets for the period concerned Proof of payment of amounts made
2	Equipment	Invoices and proof of payment Equipment is required to perform the work Demonstration of the change in value over time Rates in the contract data (hourly or daily) Time worked
3	Plant and Materials	Invoices and documentary proof of payment
4	Charges	Invoices and proof of payment
5	Manufacture and fabrication	Documentary proof
6	Design	Documentary proof
7	Insurance	Documentary proof of payment and amounts received from insurers

Figure 3: The prices for activities and preliminary and general items with the Schedule of Cost Components

accounts and records of the contractor at any time during working hours.

Contractors commonly use software packages such as CCS (Construction Computer Software) to prepare monthly evaluations to monitor any possible over-runs on tendered amounts as well as variations on cash flow. Other types of software such as Build Smart are also used to monitor measured work with actual expenditure and to allocate wages. Some use daily time cards to record the time spent by their staff on site. They also have systems in place to requisition equipment, plant and materials and monitor deliveries to site, and employ buyers to issue purchase orders. Accordingly, the starting point in the monitoring of the contractor's cost is to establish if the contractor's internal systems are capable of proving the information on costs required in terms of the contract and what reliance may be placed on their internal systems for accurate record keeping.

Audits (see Table 5) can pick up things that the project manager may miss during his assessment. At the very least, an audit can confirm that amounts claimed under the contract have been paid for and so provide the client with a reasonable level of comfort that the project costs are as stated.

If contractors are required to allocate costs to specific elements, elemental cost models can be developed. These models can in time be used to enable estimates of cost to be monitored during design development of future projects, the reasonableness of target prices and to forecast budget requirements.

THE ATTRACTIVENESS OF TARGET CONTRACTS

The sharing of the cost over-run is likely to:

- Have less of an impact on the contractor's profits than a price-based contract, and as a result, the contractor is less motivated to concentrate on minimising cost
- Reduce risk pricing in high risk premium contracts

Accordingly, target contracts are an attractive option where:

- Time or quality is more of a priority than minimum cost
- There is a relatively high measure of unquantifiable risk
- There is a relatively high risk, where the contractor may be best-placed to manage the risk, but not to carry it

The open book accounting procedures associated with target contracts gives rise to transparency of costs and leads to openness and improved collaboration in other areas. This in turn promotes a higher degree of cooperation than is apparent in most price-based contracts and provides a solid foundation for partnering approaches.

The target price can be established at tender stage or negotiated when the scope of the work is better known. The negotiation of the target price after the award of the contract facilitates the early engagement of contractors in projects and allows clients to successfully implement design, and develop and construct contracting strategies as the target price can be negotiated when the design is sufficiently advanced to allow price certainty.

Target contracts also enable framework agreements to be entered into with one or more contractors in the absence of a detailed scope of work over a term and to invite competition if necessary between framework contractors to undertake specific projects.

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