INTRODUCTION

A fundamental activity when tendering for a construction contract is the calculation of the cost or price for a job. This can be done using a range of pricing strategies, for example Bill of Quantities or Activity Schedule. According to ISO 10845-1:2010, “pricing strategy” refers to the strategy that is adopted to secure financial offers and remunerate contractors in terms of the contract. This article will illustrate some of the strategic considerations that should be taken into account by contractors when preparing tenders for contracts based on Activity Schedules such as the NEC3 Option A or Option C. A simple example of certain structural activities in an Activity Schedule for a two-storey building is used to demonstrate some of the ways in which an Activity Schedule can be developed in the tendering stage to reduce cash flow risk to the contractor during the contract phase. The way that the Activity Schedule relates to the contract programme, monthly payment assessments, assessment of price of work done to date, and administrative workload are also discussed.

ACTIVITY SCHEDULE AND THE NEC3 CONTRACT

An Activity Schedule is described by the Building Dispute Advice Services as “... a list of the activities which the Contractor expects to carry out in completing his obligations under the contract. When it has been priced by the Contractor, the sum for each activity or each group of activities is the price to be paid by the Employer for that activity or group. The total of all the activities and groups is the Contractor’s price for providing the whole of the Works. A contract based on an Activity Schedule is basically a lump sum contract.”
The NEC3 has two options based on the Activity Schedule. These are Option A (priced contract with Activity Schedule) and Option C (target contract with Activity Schedule). Kings (2013) explains that under Option A the contractor prices activities on the Activity Schedule at tender stage and submits both the Activity Schedule and the total of the prices. The Activity Schedule cannot be simply expanded after tender stage to create a better cash flow. It can only be changed “in accordance with this contract”. Option A is intended to be a low-administration contract and payment for an activity should be relatively straightforward. However, in Option C, the Activity Schedule is submitted at tender stage, but the contractor is paid on defined cost plus fee, as set out in Clause 11.2(29). Thus, the purpose of the Activity Schedule in Option A is to calculate monthly payments to the contractor, whereas in Option C it is to calculate the share. Under both Options A and C, the Activity Schedule must be updated and submitted for acceptance if the contractor has changed a planned method of working so that the activities on the Activity Schedule no longer relate to the operations on the accepted programme. An earlier article by Watermeyer (2009) highlighted some of the practical issues involved in the pricing and administration of NEC3 Option C contracts.

TENDERING AND ADMINISTERING ACTIVITY SCHEDULE-BASED NEC3 CONTRACTS
The scope of this article is limited to contract options that require Activity Schedules, as a thorough understanding of activity-based contracts is central to understanding the NEC logic. The discussion is organised under the following topics:
- Tender Submission
- Monthly Payment Assessments
- Assessment of the Price for Work Done to Date
- Administration
It is important to start the sequence of descriptions with Tender Submission, as without getting past this hurdle, the remainder is pretty irrelevant for contractors.

TENDER SUBMISSION
Submission of tenders is its own art form and all contractors will have their own views on how they assess risk and opportunity at tender stage. Pricing strategies include skewed Preliminary and General cost allocations, the loading of certain rates at the expense of others, and so on. These are not always successful and the industry is littered with pricing bets that went the wrong way. No contract is going to eliminate such strategies, but using Activity Schedules to measure the work and defined costs for calculating the cost of Compensation Events does offer the employer greater protection and affords both contracting parties a more fair and equitable method for calculating compensation for changes in the Works Information.

The crucial documents that comprise a tender submission are:
- The Works Information
- The Activity Schedule
- The Tendered Programme
- The Contract Data

### Table 1: Activity Schedule Sample 1

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Excavate and cast foundations</td>
<td>150 000</td>
</tr>
<tr>
<td>02 Cast concrete surface bed</td>
<td>35 000</td>
</tr>
<tr>
<td>03 Cast ground floor columns</td>
<td>80 000</td>
</tr>
<tr>
<td>04 Cast first floor slab</td>
<td>200 000</td>
</tr>
<tr>
<td>05 Cast first floor columns</td>
<td>45 000</td>
</tr>
<tr>
<td>06 Cast roof slab</td>
<td>220 000</td>
</tr>
</tbody>
</table>

### Table 2: Activity Schedule Sample 2

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Excavate foundations</td>
<td>30 000</td>
</tr>
<tr>
<td>02 Fix foundation reinforcement</td>
<td>50 000</td>
</tr>
<tr>
<td>03 Cast foundation concrete</td>
<td>70 000</td>
</tr>
<tr>
<td>04 Prepare earthworks to underside of surface bed</td>
<td>5 000</td>
</tr>
<tr>
<td>05 Cast surface bed concrete</td>
<td>30 000</td>
</tr>
<tr>
<td>06 Fix reinforcement to columns on grid lines 1–3</td>
<td>15 000</td>
</tr>
<tr>
<td>07 Fix reinforcement to columns on grid lines 4–6</td>
<td>15 000</td>
</tr>
<tr>
<td>08 Formwork to columns on grid lines 1–3</td>
<td>10 000</td>
</tr>
<tr>
<td>09 Formwork to columns on grid lines 4–6</td>
<td>10 000</td>
</tr>
<tr>
<td>10 Cast concrete to columns on grid lines 1–3</td>
<td>15 000</td>
</tr>
<tr>
<td>11 Cast concrete to columns on grid lines 4–6</td>
<td>15 000</td>
</tr>
</tbody>
</table>
The Works Information comprises all the documentation received from the employer that defines the work to be performed and includes drawings, codes of practice, specifications, key dates and a general description of the work to be performed. This Works Information must be thoroughly understood since it defines the work to be performed, and will be repeatedly referred to during the contract. Any deviation from it during the contract will result in a Compensation Event.

The contractor will have to submit an Activity Schedule as part of his tender. The Activity Schedule compartmentalises sections of the work into discrete packages and allocates each a cost to complete. Upon completion of the work described in an activity the contractor can claim payment for that activity in their next claim for payment. It is important, therefore, that the contractor sees the Activity Schedule as a cash flow tool.

It is important to elaborate on the composition of an Activity Schedule as it is central to the planning of NEC contracts. If an Activity Schedule is hastily and poorly conceived, it could negatively impact the contractor’s cash flow, particularly under Contract Option A.

Many practitioners will be familiar with the build-up of a Bill of Quantities (BOQ) as an instrument for pricing a contract and for later measuring monthly progress for payment. Many will also be familiar with the effort required in producing an accurate claim each month and in the often subjective views that contractors and quantity surveyors can have on the actual quantities of work completed during an assessment period. So whilst the pricing of a BOQ is fairly straightforward, which of the activities have been completed? There is no debate about how much concrete went into the foundations or how much surface bed edge formwork was erected. If at the date of assessment a contractor has completed the foundations, surface bed, and ground floor columns, the contractor is paid the lump sums for each completed activity plus a Percentage Fee.

It was mentioned earlier that the Activity Schedule should be seen as a cash flow tool by the contractor. However, there are obvious reasons why the Activity Schedule shown in Table 1 could create cash flow problems for the contractor. In the first assessment period, the contractor may not have completed the formwork and reinforcement for the first floor deck, incurring sub-contractor costs that he would have to pay, but because the slab concrete has not been cast, the contractor will receive no payment for the activity.

A practical solution therefore would be to submit a more comprehensive Activity Schedule, where activities 01–03 in Table 1 (totalling R265 000) were considered for payment.

Two advantages flow from this system (i.e. an activity-based system). The first is that contractors would tend to consider their construction programmes far more carefully at tender stage. The second is that there is a far greater incentive for contractors to adhere to their programmes during construction, as not achieving the completion of activities before the assessment date can adversely affect their cash flow.

Certain tender documents will define the activities that the contractor has to include in a tender, but most will allow a contractor to define his own activities in building up the Activity Schedule. A strategic approach should be used in the development of an Activity Schedule. A simple example of certain structural activities in an Activity Schedule for a two-storey building is used in Tables 1–3 to demonstrate the strategic approach that may be used by a contractor.

The descriptions of the activities are simple yet complete and describe the whole structural process from foundation excavation to the casting of the roof slab.

By using the Activity Schedule shown, it can be seen that the effort in submitting and assessing a monthly claim is pretty straightforward. Which of the activities have been completed? There is no debate about how much concrete went into the foundations or how much surface bed edge formwork was erected. If at the date of assessment a contractor has completed the foundations, surface bed, and ground floor columns, the contractor is paid the lump sums for each completed activity plus a Percentage Fee.

Table 3: Activity Schedule Sample 3

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Excavate foundations</td>
<td>R30 000</td>
</tr>
<tr>
<td>02</td>
<td>Fix foundation reinforcement</td>
<td>R50 000</td>
</tr>
<tr>
<td>03</td>
<td>Cast foundation concrete</td>
<td>R70 000</td>
</tr>
<tr>
<td>04</td>
<td>Prepare earthworks to underside of surface bed excluding portion bounded by grid lines D,E &amp; 3,4 to allow for crane tower access</td>
<td>R4 000</td>
</tr>
<tr>
<td>05</td>
<td>Prepare earthworks to underside of surface bed to area bounded by grid lines D,E &amp; 3,4</td>
<td>R1 000</td>
</tr>
<tr>
<td>06</td>
<td>Cast surface bed concrete excluding portion bounded by grid lines D,E and 3,4 to allow for crane tower access</td>
<td>R27 000</td>
</tr>
<tr>
<td>07</td>
<td>Cast surface bed concrete to area bounded by grid lines D,E &amp; 3,4</td>
<td>R3 000</td>
</tr>
</tbody>
</table>
In the Activity Schedule in Table 2 the description of foundation activities has increased from the one mentioned in Table 1 to three activities. The surface bed activity has increased to two, and the single activity for ground floor columns has increased to six activities.

The cash flow risk to the contractor has now been considerably reduced, as any incomplete activity has a greatly reduced financial impact and the activities have been described so that they coincide with sub-contractor payments that the contractor will have to make.

The illustrative examples in Tables 1 and 2 reiterate the importance of the contractor giving careful thought to the build-up of the activities and their impact on the programme. It is important that, at tender stage, the contractor carefully considers any event that might prevent the completion of an activity. If, for example, it was necessary to have a tower crane on site, located within the structure, this would have a dramatic effect on the completion of standard activities.

In our example above, the contractor would not get paid for the preparation of earthworks to the underside of the surface bed or for the casting of the surface bed concrete until after the crane had been dismantled and he was then able to complete these activities. This would also be the case for all slabs that the crane tower penetrated.

Therefore it would have made more sense commercially if activities 01–05 in Table 2 were described in the following seven activities in Table 3.

In the Activity Schedule in Table 3, the foundation activities have remained as they were, but the two surface bed activities have been expanded into four activities to allow for the casting of the surface bed in a portion that is unaffected by the crane and a portion that will only be cast on removal of the crane tower.

One of the areas of confusion when contractors are first exposed to the NEC contract is the concept of ‘The Fee’. Under the Option C contract option, for example, Preliminary and General costs are kept distinct from the contractor’s mark-up for profit. In the NEC contract there is still a large element of Preliminary and General costs (although it is not referred to as such) to be included in the Activity Schedule. Certain Preliminary and General costs, such as head office costs, costs of insurance and costs of raising performance bonds are included in ‘The Fee’ together with the contractor’s profit mark-up.

It is necessary, therefore, to include an activity that could be described as ‘Site Management and Equipment’ and which would recur monthly in the Activity Schedule. One must be clear on how this is described in the Activity Schedule, bearing in mind that, for an activity to be successfully assessed for payment, such an activity must be completed by the Assessment Date. If one were to describe an activity as ‘Site Management and Equipment for February 2017’, and the Assessment Date was on the 25th of each month, the activity could only be considered as complete by the March 2017 Assessment Date. It would make sense, therefore, to describe the activity as ‘Site Management and Equipment for the period 25 January 2017 to 24 February 2017’ in the Activity Schedule, thereby ensuring it was assessed as Work Done to Date on 25 February 2017.

In the NEC contract, ‘Equipment’ refers to the contractor’s ‘yellow metal’ and other equipment that is needed to perform the Works. ‘Plant’ refers to mechanical items such as air conditioning systems that will form part of the completed Works.

In preparing the Activity Schedule, and at the same time determining the costs of each activity, the contractor would have developed a time required to complete each activity. The programme is then developed by combining the completion times for each of the activities into a programme that identifies Critical Paths and Floats, and which makes allowance for adverse weather conditions and for time risk. It is important that the starting date, access dates, key dates and the completion date are shown. If the contractor requires the provision of plant or information from the employer on a specific date, this must be shown in the programme.

It is important that the contractor not only considers the programme as a projection of how he will complete the project, but that the contractor also uses it to define when he expects the employer and others to perform during the project. Without this the contractor will be less able to claim delays by others as Compensation Events.

As a minimum, therefore, the contractor’s programme at tender stage should show the following:

- Starting date, access dates, key dates and the completion date

<table>
<thead>
<tr>
<th>Contract Option</th>
<th>Contract Description</th>
<th>The Price for Work Done to Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Priced Contract with Activity Schedule</td>
<td>Total of the prices for completed activities</td>
</tr>
<tr>
<td>B</td>
<td>Priced Contract with Bill of Quantities</td>
<td>Quantitess of completed work at BOQ rates + proportions of lump sums</td>
</tr>
<tr>
<td>C</td>
<td>Target Contract with Activity Schedule</td>
<td>Defined Cost forecast to be paid before next assessment date + Fee</td>
</tr>
<tr>
<td>D</td>
<td>Target Contract with Bill of Quantities</td>
<td>Defined Cost forecast to be paid before next assessment date + Fee</td>
</tr>
<tr>
<td>E</td>
<td>Cost Reimbursable Contract</td>
<td>Defined Cost forecast to be paid before next assessment date + Fee</td>
</tr>
<tr>
<td>F</td>
<td>Management Contract</td>
<td>Defined Cost forecast to be paid before next assessment date + Fee</td>
</tr>
</tbody>
</table>
The order and timing of the contractor’s own work
Method Statement outlining equipment and resources required
The order and timing of work by the employer and others as stated in the Works Information
The dates when the contractor will require plant or materials to be provided by the employer or others
The dates when the contractor requires information from the employer or others
Provisions for float and allowances for weather and time-risk

It is worth noting that if the contractor has not submitted a programme then the project manager retains 25% of the assessment value to date, until the contractor has submitted his programme.

The tender documentation provided to the contractor will include the Contract Data. This contains information that is specific to the contract on which the contractor will be tendering.

Part 1 of the Contract Data is completed by the employer. Part 1 defines, amongst other things, the starting date, access dates, key dates and the completion date. It also lists any plant and materials to be provided by the employer, employer risks and insurance responsibilities. Importantly, it defines which of the ‘X’ clauses are to be used and any ‘Z’ clauses that may be relevant to the contract.

Part 2 is to be completed by the contractor and, amongst other things, lists key people, the total tendered price and fee percentages. Importantly, it also lists matters that the contractor would like included in the Risk Register and the Schedule of Cost Components. Listing items that the contractor would like included in the Risk Register is an opportunity for the contractor to identify at the outset activities or requirements that he believes could be a risk to completing the project within the budget or within the tendered programme. An example might be ‘The risk that a way leave is not granted in time for the road crossing’. Submitting potential risk alerts allows such risks to be addressed early on in the contract, before they can cause delays to the contract.

A very important section of the Contract Data is the Schedule of Cost Components. This forms the basis for the calculation of Compensation Events during the contract. The contractor must submit the basis on which he wants to be compensated for Compensation Events, by providing certain costs of people, equipment and percentage overheads.

In the Returnable Schedules that the contractor is expected to submit with the tender, there should be a ‘Schedule of Deviations’. It is important that this is completed to identify any deviations from the Works Information that the contractor wishes to notify the employer of. The employer may have called for a formwork system that the contractor has no access to, or he may have called for the use of a software programme that the contractor does not use. If listed in the Schedule of Deviations, the contractor is then protected from the employer enforcing the use of the systems that may be inaccessible or costly to acquire.

MONTHLY PAYMENT ASSESSMENTS

The Date of Assessment may be defined in the Contract Data or it may be agreed at the start of the contract by all parties.

Each month the contractor submits a claim for payment on the assessment date. Interestingly, if the contractor does not submit a claim, the project manager is still obliged to make an assessment of the Price for Work Done to Date on the Assessment Date. The project manager cannot refuse to assess the Price for Work Done to Date by the contractor. In the absence of a claim by the contractor, the project manager must make his own assessment.

The project manager has one week from the Assessment Date in which to certify a payment.

Unless otherwise stated in the Contract Data, payment to the contractor must be made within three weeks of the Assessment Date (not the date on which the payment was certified, as this date could vary, whereas the Assessment Date is agreed to in the Contract Data).

The calculation of the value of the Price for Work Done to Date varies with the different Contract Options, as shown in Table 4.

ASSESSMENT OF THE PRICE FOR WORK DONE TO DATE

In Option A, which is an activity-based contract, the assessment is determined by the completed activities. Option B is assessed as quantities completed at BOQ rates. Options C–F are assessed on Defined Cost which is forecast to be paid before the next assessment plus the Fee.

Options C–F are a boost to the contractor’s cash flow. Under these contract options, the Prices for Work Done to Date cover all expenses to date and make allowance for payments that the contractor forecasts to make before the next assessment date. The Fee is then added to this amount. Examples of forecast payments before the next assessment might be:

Fortnightly payments to sub-contractors
All salaries payable before the next assessment

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Any advance payments that might have to be made to suppliers
Insurance premiums
The contractor is being paid for such costs at least a month earlier than he would on any other contract. Many infrastructural projects now require that a considerable percentage of the contract value must be spent on local contractors, who generally require payments that are more frequent than monthly. The cash flow difficulties arising from such frequent payments are removed as a result of the assessment of forecast payments.

ADMINISTRATION

If any contract is to be effectively applied it requires an administrative commitment from all parties. It requires, in addition, that all parties, if they don’t have an in-depth understanding of the contract documentation, at least appreciate the logic and rationale behind the contract and understand clauses that impact on the day-to-day running of the contract. The administrative load of the NEC contract can be divided into five categories:

- Administration
- Tender Preparation
- Contract Administration
- Financial Administration (Option C)
- Final Account Settlement

In the Activity Schedule-based options of the NEC contract, there is no doubt that there is a greater administrative cost in preparing a tender than there is in a Bill of Quantities-based contract. It is important to submit tender documentation that has carefully thought out activities within the Activity Schedule. Contractors also need to develop an accurate tender programme in tandem with the Activity Schedule. Additional administrative effort is also required to submit Method Statements and data for the Schedule of Cost Components.

While the Tender Administrative burden is apparently increased, one must bear in mind that, should the contractor be successful in his bid, he will be far better prepared to undertake the contract than had he simply submitted a priced Bill of Quantities. In the event that the contractor is awarded the contract, the tender preparation costs should be recovered in reduced planning once the contract commences.

From an employer’s perspective, it is important that one chooses contractors who are capable of the detailed tender planning, and that the Works Information is as complete as possible. If the Works Information is vague or inaccurate it will lead to costly Compensation Events. There is a degree of reassurance for the employer once a contractor agrees to tender on an activity-based contract, since the employer can be reasonably sure that the contractor has a real desire to compete for the contract. This is not necessarily true of Bill of Quantities tenders, where the contractor’s efforts and risk at tender stage are greatly reduced, and where he may take a shotgun approach to tendering, knowing that the more tenders he submits the greater his chance of winning one.

To run any contract effectively takes administrative effort on site. However, contractors may not always address contractual issues, as a result of the pressures required to get the job done. At times contractors may also recoil from initiating contractual processes for fear that they may antagonise one of the other role-players on site and start a vindictive chain reaction.

The NEC contract tries to address these issues by compelling parties to give Early Warnings and Notifications for Compensation Events with clearly defined response times. It tries to engender a spirit of cooperation, and if one can commit the administrative resources to site that allow this, it will save wasteful administration at the end of the contract in attempts to resolve festering disputes.

This article earlier alluded to the method of assessment for the Price of Work Done to Date for Contract Options C–F, and how these benefited the contractor’s cash flow by forecasting expenses that the contractor would incur up to the next assessment date. However, there is a worthwhile financial administration price to be paid for this. The basis of measuring the Work Done to Date on such Contracts is through an assessment of the contractor’s orders, delivery notes, invoices, proof of payments and pay rolls. The contractor is paid for these costs with the Fee Percentage added. It is important, therefore, that the contractor has an efficient method of collating such financial documentation, and of presenting it to the project manager or his representative for assessment. This is all more administrative work than one would normally require for the financial management of a contract, but it has three main benefits. First, in Contract Options C–F it improves the contractor’s cash flow. Second, all parties are acutely aware of the actual costs to date. Third, monthly audits result in the final account being speedily resolved. Again, one could argue that the additional financial administration during the contract saves wasted administration at the end of the contract in attempts to resolve the final account.

CONCLUSION

Based on the issues discussed in this article, some conditions for the success of NEC3 activity-based contracts are summarised as follows:

- The contract is fair to all parties and does allow the contractor to make a fair profit if the contract has been correctly priced and planned.
- The employer must ensure that the Works Information is complete and of the highest quality to avoid costly Compensation Events during the contract.
- All parties must understand the contract and have competent administrators.
- There must be clear and frequent communication between the project manager and the contractor.
- The programme must be constantly updated.
- The contractor must keep clear daily records.
- A spirit of trust and cooperation between the parties must exist.

REFERENCES

ISO (International Organization for Standardization) 2010. 
