Bills of Quantities (BoQ)

Synopsis:

Bills of quantities (BoQ) are the most common form of pricing strategy used where the contractor undertakes construction works on the basis of full designs issued by the employer. This practice note outlines what a bill of quantities is and provides a recommended procedure for evaluating tenders where the prices are based on a BoQ. The recommended procedure suggests that a priced BoQ is not included in the tender submission and is only called for from the highest ranked or scoring tenderer during the tender evaluation process so that the acceptability of the rates can be confirmed prior to the award of a contract.
1. What is BoQ?

Bills of quantities (BoQ) are the most common form of pricing strategy used where the contractor undertakes construction on the basis of full designs issued by the employer.

A BoQ (sometimes referred to as a schedule of quantities) is a list of items giving the measured or estimated quantities and a brief description of the work to be performed under the contract. The quantities and descriptions are derived and measured from the drawings and specifications. The BoQ allows for the insertion of a rate against each item and the extension and totalling of the prices.

A BoQ has a dual purpose:
- It presents information to tenderers to enable them, by pricing each individual item as it relates to the contract data (and associated conditions of contract), the scope of work (including the specifications and drawings), the site information, to arrive at a total of prices, all of which are founded on a basis common to all tenderers.
- It allows those responsible for evaluating tenders to understand how the works have been priced.

Once a contract is awarded, the priced bill of quantities provides:
- The means by which the works can be valued and paid for during construction; and
- Depending upon the form of contract that is used, the basis for determining the changes in prices arising from changes to the scope of work or delays and disruptions.

The contractor is paid an amount for the item of work in a bill (which is the rate for the work multiplied by the quantity completed).

2. Why use a BoQ?

The use of a BoQ on construction works contracts permits four important objectives to be achieved, these being:
- Tenderers are provided with adequate information regarding the extent of the work required to enable them to accurately and confidently prepare responsive tenders;
- Tender prices can be objectively compared as they have been submitted using the same information;
- Employers, provided that all the work has been measured, can pre-determine the costs of contracts (and the impact of possible variations to the works) with a high degree of accuracy; and
- The value of work carried out at any stage of a contract can be objectively determined.
Bills of quantities will be more effective in achieving the foregoing objectives if they:
• Comprehensively and accurately reflect the nature of the work proposed and the circumstances under which it will be executed;
• Are prepared in a standard manner for all contracts; and
• Are brief and simple to use, while still being itemised in sufficient detail to distinguish between different classes of work, and between work of the same nature carried out in differing circumstances and locations.

A BoQ is usually prepared in accordance with a standard system of measurement that provides rules and procedures for describing, measuring and documenting the works in a standard manner.

### 3. Pricing a BoQ

The total of a tender price typically include:

- **General items**: being the items to cover the charges for compliance with contractual obligations as well as costs not directly related to construction activities.

- **Construction (work) content**: being the estimates of the cost of all the items that are to be constructed or built either using own resources or subcontracted resources (i.e., cost of people, plant, equipment and materials costs based on data gathered from previous projects, manufacturers of products and suppliers of equipment, trade associations and technical publications).

- **Overheads**: being the operating (every day) expenses incurred in the upkeep of the business and its offices that are not attributable to individual contracts including total cost of office personnel and finance changes.

- **Risk allowance**: being an allowance to cover the perceived risks associated with the contract and the works.

- **Profit**: being the amount of profit that is added on by a construction business that does not include any of the above.

Estimates of costs are often made for groups of activities, trades or elements in relation to a construction programme. These costs include subcontract prices submitted by numerous subcontractors who usually submit a lump sum prices for inclusion in the tender. These costs are then converted into rates. Overheads, risk and profit may be spread across all the rates or included in only some of them.
of the rates, depending upon the method of operation that is employed by the contractor.

It is more important to get the total price correct for a project (rather than the individual rates where bills of quantities are used) as the total of prices determines competitive position. The rates in bills of quantities should nevertheless be a realistic assessment of the price for an item as any variations in quantities will:

- Affect the total amount paid by the employer; and
- Depending upon the form of contract that is used, form the basis for assessing the variations to the contract price arising from any changes to the scope of work.

Excessively high prices can cause a tenderer to be overlooked for the award of a contract due to un-competitiveness, whilst too low a price may be construed as a serious risk to a tenderer. Tenderers often analyse their tenders prior to submission and increase or decrease rates where they feel that quantities may increase or decrease in order to be more competitive or to manage risk. They may also decrease their profit. This practice may lead to unbalanced rates and present an undue risk to clients.

### 4. Evaluation of tenders where a BoQ forms the basis for price

The completion of a BoQ by a tenderer is a onerous task which needs to be completed within relative short time frames. Many decisions need to be made including what is the total tender price, what is the overheads and risk allowance and profit that is to be applied and what are the rates for each item. The rates that are tendered may also need to be determined from the estimated costs for groups of activities linked to a programme. Once a decision regarding the total tender price has been reached, the rates for each and every item need to be finalised. This can be a time consuming exercise.

The marking up of individual rates for overheads, risk allowance and profit as well as the request to subcontractors for individual rates usually only occurs once the tender has been submitted and is obviously not required if the tender is unsuccessful. The preparation of fully priced bills of quantities, particularly for building work, for unsuccessful tenders adds unnecessarily to the cost of tendering. This cost is passed on to the client indirectly in the form of an increase in overhead costs.

The requirement to submit a bill of quantities together with a tender can discourage tenderers from submitting tenders, particularly when work is plentiful. Tenderers may not have the
time to prepare and finalise a BoQ prior to the closing time for
tenders. Tenderers may prefer to submit tenders to clients who
do not require a completed BoQ to be submitted with their
tender and only request a BoQ when there is a likelihood that
they may be awarded the contract.

In compliance with the constitutional imperatives for transparency
in procurement, the cidb Standard Conditions of Tender requires
that the competitive position of tenderers be determined by the
total of prices that are submitted i.e. the prices that are read
out at the tender opening. This effectively means that the rates
contained in a BoQ are not considered when tenders are ranked
according to tendered price. Rates only become a factor during
the evaluation process when confirming the correctness of what
was offered i.e. the arithmetical correctness of the extensions
and the totalling of prices in the bill of quantities with the highest
ranked or scoring tenderer. Errors in the computed tender price
can, in some circumstances lead to the situation in which the
competitive position of tenderers change.

In such cases the procedure needs to be
repeated. (See cidb Inform Practice Note #2
– Correcting arithmetical errors in tenders).

An analysis of rates becomes critical when
considering whether or not to recommend
the most competitive tenderer for the
award of a contract i.e. when the evaluator
ascertains if unduly high or low tendered
rates, unbalanced rates or amounts in
the tender offer present an unacceptable
commercial risk to the employer. (See cidb
Inform Practice Note #3 – Evaluating tender
offers).

**cidb Standard Conditions of Tender**

**F.3.9 Arithmetical errors, omissions and discrepancies**

**F.3.9.2** Check the highest ranked tender or tenderer with the
highest number of tender evaluation points after the evaluation
of tender offers in accordance with F.3.11 for:

a) The gross misplacement of the decimal point in any unit rate;
b) Omissions made in completing the pricing schedule or bills
   of quantities; or
c) Arithmetic errors in:
   i) Line item totals resulting from the product of a unit
      rate and a quantity in bills of quantities or schedules of
      prices; or
   ii) The summation of the prices.
5. Submitting a BoQ with a tender

The cidb standard conditions of tender permit the employer to request a tenderer to submit a bill of quantities after the closing time for tenders.

Employers may request tenderers to just complete the summary of the BoQ for each component of the BoQ and include this summary with their tender submission. These summaries, which are not onerous to complete, provide sufficient information regarding the breakdown of the prices to identify potential anomalies and allow any unrealistically priced tenders to be detected. Tenderers may, in terms of the cidb Standard Conditions of Tender (clause F.2.17), be requested to provide a breakdown of rates in order to clarify their pricing structure or to motivate their pricing of a component of the BoQ.

---

### Summary of bill of quantities

<table>
<thead>
<tr>
<th>Bill No</th>
<th>No</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preliminaries</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Earthworks</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Concrete formwork and reinforcement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Masonry</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Roof coverings etc.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Carpentry and joinery</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ceilings, partitions and access flooring</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Floor covering</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Plastering</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Tiling</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Plumbing And Drainage</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Electrical Work</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Glazing</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Paintwork</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>External works</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vat @14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total of prices carried forward to the form of offer and acceptance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In summary, the cidb recommends that in general:

1) Tenderers are not required to include priced BoQs with their tender submissions at the closing time for tenders. (Tenders may, where necessary, be required to complete the summary of the BoQ and include this in their tender submission).

2) During the evaluation process, the highest ranked or highest scoring tenderer should be requested in terms of clause F.2.17 and F.2.18 to submit a fully priced BoQ.

3) The acceptability of the rates in the BoQ should be confirmed before recommending the award of the contract to the tenderer.

4) The accepted BoQ may be incorporated into the contract that is entered into.