

# Appendix A: Guidance on the preparation of bill of quantities

## A.1 Bill of quantities breakdown structure

**A.1.1** There are a number of different breakdown structures for bill of quantities (BQ). They each have their own advantages and disadvantages. However, computerised BQ production systems with multiple sort facilities can be used to generate different BQ formats and make it easy to trace items – as long as items have been properly codified (refer to 2.15 (Codification of bill of quantities)).

**A.1.2** *NRM 2: Detailed measurement for building works* can be adopted as the rules of measurement for building works irrespective of what BQ breakdown structure is chosen.

**A.1.3** The main BQ breakdown structures are:

- (a) **Elemental:** Measurement and description is done by group elements and each group element forms a separate section of the BQ, irrespective of the order of work sections in *NRM 2: Detailed measurement for building works*. Group elements are sub-divided through the use of elements, which are further sub-divided by sub-elements. The group elements, elements and sub-elements used are those defined by *NRM 1: Order of cost estimating and cost planning for capital building works*.

**Figure A.1: Elemental BQ breakdown structures for a simple building project**

Elemental breakdown structure	
Bill No. 1:	Preliminaries (main contract)
Bill No. 2:	Facilitating Works
Bill No. 3:	Substructure
Bill No. 4:	Superstructure
Bill No. 5:	Internal Finishes
Bill No. 6:	Fittings, Furnishings and Equipment
Bill No. 7:	Services
Bill No. 8:	External Works
Bill No. 9:	Risks
Bill No. 10:	Provisional Sums
Bill No. 11:	Credits
Bill No. 12:	Daywork (provisional)

An elemental breakdown structure supports a logical and structured approach to the quantification of a building project. Moreover, this type of breakdown structure makes it easier for the quantity surveyor/cost manager to analyse a contractor's tender price and collect real-time cost data for future use.

- (b) **Work section:** Measurement and description is divided into the work sections listed in *NRM 2: Detailed measurement for building works* (refer to the tabulated rules in Part 3 of these rules).

**Figure A.2: Work section BQ breakdown structures for a simple building project**

Work section breakdown structure	
Bill No. 1:	Main contractor's preliminaries
Bill No. 2:	Off-site manufactured materials, components and buildings
Bill No. 3:	Demolitions
Bill No. 4:	Alterations, repairs and conservation
Bill No. 5:	Excavating and filling
Bill No. 6:	Ground remediation and soil stabilisation
Bill No. 7:	Piling
Bill No. 8:	Underpinning
Bill No. 9:	Diaphragm walls and embedded retaining walls
Bill No. 10:	Crib walls, gabions and reinforced earth
Bill No. 11:	In-situ concrete works
Bill No. 12:	Precast/composite concrete
Bill No. 13:	Precast concrete
Bill No. 14:	Masonry
Bill No. 15:	Structural metalwork
Bill No. 16:	Carpentry
Bill No. 17:	Sheet roof coverings
Bill No. 18:	Tile and slate roof and wall coverings
Bill No. 19:	Waterproofing
Bill No. 20:	Proprietary linings and partitions
Bill No. 21:	Cladding and covering
Bill No. 22:	General joinery
Bill No. 23:	Windows, screens and lights
Bill No. 24:	Doors, shutters and hatches
Bill No. 25:	Stairs, walkways and balustrades
Bill No. 26:	Metalwork
Bill No. 27:	Glazing
Bill No. 28:	Floor, wall, ceiling and roof finishings
Bill No. 29:	Decoration
Bill No. 30:	Suspended ceilings
Bill No. 31:	Insulation, fire stopping and fire protection
Bill No. 32:	Furniture, fittings and equipment
Bill No. 33:	Drainage above ground
Bill No. 34:	Drainage below ground
Bill No. 35:	Site works
Bill No. 36:	Fencing
Bill No. 37:	Soft landscaping
Bill No. 38:	Mechanical services
Bill No. 39:	Electrical services
Bill No. 40:	Transport
Bill No. 41:	Builder's work in connection with mechanical, electrical and transportation installations
Bill No. 42:	Risks
Bill No. 43:	Provisional sums
Bill No. 44:	Credits
Bill No. 45:	Daywork (Provisional)

This breakdown structure is often preferred by contractors for the purpose of pricing as all like products and components are grouped together (e.g. the reinforced concrete columns, beams, floors, roofs and staircases), whereas they can be spread among a number of different elements

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when an elemental breakdown structure is used. Codification of BQ items using computerised BQ systems will solve the problem of preferences (refer to 2.15 (Codification of bill of quantities) of the rules).

- (c) **Work package:** Measurement and description is divided into employer, quantity surveyor or contractor defined work packages – whichever is applicable. Works packages can be based on either a specific-trade (e.g. concrete work, brickwork and blockwork, roof coverings, painting and decorating, and wall tiling) or a single package comprising a number of different trades (e.g. a groundworks package might include all excavation and earthworks, below ground drainage and the ground-bearing concrete floor-slab – so as to make a single works contractor responsible for the interface between the drainage and the ground-bearing concrete floor-slab).

**Figure A.3: Typical BQ breakdown structure for discrete work package**

Work section breakdown structure	
Bill No. 1:	Main contractor's preliminaries
Bill No. 2:	Intrusive investigations
Bill No. 3:	Demolition works
Bill No. 4:	Groundworks
Bill No. 5:	Piling
Bill No. 6:	Concrete works
Bill No. 7:	Roof coverings and roof drainage
Bill No. 8:	External and internal structural walls
Bill No. 9:	Cladding
Bill No. 10:	Windows and external doors
Bill No. 11:	Mastic
Bill No. 12:	Non-structural walls and partitions
Bill No. 13:	Joinery
Bill No. 14:	Suspended ceilings
Bill No. 15:	Architectural metalwork
Bill No. 16:	Tiling
Bill No. 17:	Painting and decorating
Bill No. 18:	Floor coverings
Bill No. 19:	Fittings, furnishings and equipment
Bill No. 20:	Combined mechanical and electrical engineering services
Bill No. 21:	Lifts and escalators
Bill No. 22:	Facade access equipment
Bill No. 23:	External works and drainage
Bill No. 24:	Risks
Bill No. 25:	Provisional sums
Bill No. 26:	Credits
Bill No. 27:	Daywork (Provisional)

Again, codification of BQ items using computerised BQ systems will allow the re-sorting of items from elements to works packages for the purposes of tendering, and vice versa for the purpose of overall cost control (refer to 2.15 (Codification of bill of quantities) at Part 2 of these rules).

This breakdown structure is usually used by contractors to procure packages of work from their supply chain.

## A.2 Bill of quantities breakdown structure for projects comprising more than one building

Where a building project comprises more than one type of building, it is recommended that a separate bill of quantities be prepared for each building; culminating in a 'summary bill' for the entire building project.

## A.3 Order of items in bill of quantities

The order of items in a bill of quantities (BQ) is:

### (1) For elemental BQ:

- (a) Elements as contained in *NRM 1: Order of cost estimating and cost planning for capital building works*.
- (b) Within each element the order of measured items is cubic, square, linear, enumerated items and itemised items.
- (c) Labour-only items are to precede labour and material items within the subdivisions in (b).
- (d) Items within each subdivision in (b) and (c) above are to be placed in order of value, least expensive first.
- (e) Preambles are to be incorporated in each element as appropriate.
- (f) PC sums are to be incorporated in item descriptions.
- (g) Contractor designed works are to be incorporated under the applicable element or sub-element, after measured work, under a heading of 'Contractor designed work'. A price analysis for contractor designed work is to be incorporated (see paragraph 2.9.2 (Contractor designed work) in Part 2 (Rules for detailed measurement of building works) of these rules).
- (h) Provisional sums are to be listed and described in a separate bill.
- (i) Construction risks to be transferred to the contractor are to be identified and described in a 'schedule of construction risks' (see paragraph 2.10.2 (Risk transfer to the contractor) in Part 2 (Rules for detailed measurement of building works) of these rules).
- (j) Where applicable, provision for the contractor to offer credits against items and components arising from demolition works and/or soft strip works is to be provided (see paragraph 2.12 (Credits) in Part 2 (Rules for detailed measurement of building works) of these rules).

### (2) For work section BQ:

- (a) Work sections as contained in *NRM 2: Detailed measurement for building works*, although separate locational BQ sections such as facilitating works, substructure, superstructure and or external works might be required.
- (b) Subdivisions:
  - (i) of work sections as contained in *NRM 2: Detailed measurement for building works*;
  - (ii) as required by *NRM 2: Detailed measurement for building works*, such as external paintwork;
  - (iii) of different types of materials; such as different mixes of concrete, different types of brick.
- (c) Within each subdivision in (b), the order of cubic, square, linear, enumerated items and itemised items.
- (d) Labour-only items are to precede labour and material items within the subdivisions in (c).
- (e) Items within each subdivision in (c) and (d) above are to be placed in order of value, least expensive first.
- (f) Preambles are to be incorporated in the appropriate work section.
- (g) PC sums are to be incorporated in item descriptions.
- (h) Contractor designed works are to be incorporated under the applicable element or sub-element, after measured work, under a heading of 'Contractor designed work'. A price analysis for contractor designed work is to be incorporated (see paragraph 2.9.2 (Contractor designed work) in Part 2 (Rules for detailed measurement of building works) of these rules).

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- (i) Provisional sums are to be listed and described in a separate bill.
  - (j) Construction risks to be transferred to the contractor are to be identified and described in a 'schedule of construction risks' (see paragraph 2.10.2 (Risk transfer to the contractor) in Part 2 (Rules for detailed measurement of building works) of these rules).
  - (k) Where applicable, provision for the contractor to offer credits against items and components arising from demolition works and/or soft strip works is to be provided (see paragraph 2.12 (Credits) in Part 2 (Rules for detailed measurement of building works) of these rules).
- (3) For work package BQ:**
- (a) Work packages as defined by the employer, quantity surveyor or contractor, whichever is applicable.
  - (b) Within each work package the order of measured items is cubic, square, linear, enumerated items and itemised items.
  - (c) Labour-only items are to precede labour and material items within the subdivisions in (b).
  - (d) Items within each subdivision in (b) and (c) above are to be placed in order of value, least expensive first.
  - (e) Preambles are to be incorporated in the appropriate work package.
  - (f) PC sums are to be incorporated in item descriptions.
  - (g) Contractor designed works are to be incorporated into the applicable work package bill, after measured work, under a heading of 'Contractor designed work', under a heading of 'Contractor designed work'. A price analysis for contractor designed work is to be included (see paragraph 2.9.2 (Contractor designed work) in Part 2 (Rules for detailed measurement of building works) of these rules).
  - (h) Provisional sums are to be listed and described in a separate bill.
  - (i) Construction risks to be transferred to the contractor are to be identified and described in a 'schedule of construction risks' (see paragraph 2.10.2 (Risk transfer to the contractor) in Part 2 (Rules for detailed measurement of building works) of these rules).
  - (j) Where applicable, provision for the contractor to offer credits against items and components arising from demolition works and/or soft strip works is to be provided (see paragraph 2.12 (Credits) in Part 2 (Rules for detailed measurement of building works) of these rules).

## A.4 Format of bill

The bill for each element or work section is to be commenced on a new sheet. The ruling of the paper and typical headings for each type of bill are shown in Figures A.4 and A.5.

**Figure A.4: Typical BQ format for an elemental bill of quantities**

Bill No. 3 Superstructure							
3.2.5 External walls							
3.2.5.1	<u>EXTERNAL WALLS ABOVE GROUND FLOOR LEVEL</u>						
3.2.5.1.1	Common brickwork in cement: lime mortar (1:1:6)						
3.2.5.1.1.1	Walls 102.5mm thick, brickwork; built against other work	196	m <sup>2</sup>				
3.2.5.1.1.2	Walls 215mm thick, brickwork	302	m <sup>2</sup>				

**Figure A.5: Typical BQ format for a work section bill of quantities**

Bill No. 2 Superstructure							
2.14 Masonry							
2.14.1	<u>BRICK/BLOCK WALLING</u>						
2.14.1.1	<u>Common brickwork in cement: lime mortar (1:1:6)</u>						
2.14.1.1.1	Walls 102.5mm thick, brickwork; built against other work	196	m <sup>2</sup>				
2.14.1.1.2	Walls 215mm thick, brickwork	302	m <sup>2</sup>				

**Figure A.6: Typical BQ format for a work package bill of quantities**

Bill No. 8 EXTERNAL AND INTERNAL STRUCTURAL WALLS							
8.1 Masonry							
8.1.1	<u>BRICK/BLOCK WALLING</u>						
8.1.1.1	<u>Common brickwork in cement: lime mortar (1:1:6)</u>						
8.1.1.1.1	Walls 102.5mm thick, brickwork; built against other work	196	m <sup>2</sup>				
8.1.1.1.2	Walls 215mm thick, brickwork	302	m <sup>2</sup>				

## A.5 Codifying items

As well as for the purpose of making it easy to search, it is essential that every item in the bill of quantities (BQ) can be referenced back to the cost plan.

## A.6 Unit of measurement

The units of measurement for items are stipulated by the tabulated rules of measurement. For the purpose of clarity, the unit of measurement is to be entered against each item in the bill of quantities, irrespective of whether it is the same unit as the previous item.

## A.7 Order of sizes

Sizes or dimensions in descriptions are to be in the order: length, width, height. Sometimes the width of a component (e.g. a base unit) is referred to as its 'depth'. If there is likely to be any doubt, for the purpose of clarity, the dimensions are to be stated.

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For example:

Base unit: 1000mm long x 600mm wide x 900mm high; ...

### A.8 Use of headings

Headings usually fall into one of four categories:

- 1 Elemental or work section headings
- 2 Element or sub-section headings
- 3 Headings that partly describe a group of items
- 4 Subdivisions required by *NRM 2: Detailed measurement for building works*.

### A.9 Unit of billing

Other than enumerated and itemised items, the unit of measurement is the metre. The exception to this rule is steel bar reinforcement and structural steelwork, which are billed in tonnes to two decimal places.

### A.10 Framing of descriptions

The bill of quantities is a legal document. Therefore, care should be taken when framing descriptions so that there is no doubt as to their meaning.

### A.11 Totalling pages

There are a number of ways in which the quantity surveyor/cost manager might indicate how the cash totals on each page of the bill are to be dealt with. The preferred method is for the total to be carried over to be added to the next page and so on until the end of the bill or sub-section of the bill. Unless the bill section comprises only one page, the foot of the first and intermediate bill pages should be completed as follows:

**Figure A.7: Examples of how to total pages**

		Carried forward	£		

The top of the following bill page is completed as follows:

BILL 3: SUPERSTRUCTURE					
2.5 EXTERNAL WALLS					
		Brought forward	£		

To end each bill section, the section is completed as follows:

		TOTAL carried to main summary	£		

### A.12 Price summary

Templates for the pricing summary for elemental bill of quantities (condensed and expanded versions) are included at Appendices D and E, respectively, of these rules. The structure of pricing summaries for other bill of quantities formats should follow the same principles.