

2015-10-13

## Composing Descriptions for Bills of Quantities in Accordance with ARM 4 – Worked Examples

Tony Cunningham

*Technological University Dublin, [tony.cunningham@tudublin.ie](mailto:tony.cunningham@tudublin.ie)*

Follow this and additional works at: <https://arrow.tudublin.ie/beschreoth>



Part of the [Construction Engineering Commons](#)

---

### Recommended Citation

Cunningham, T. (2015). Composing Descriptions for Bills of Quantities in Accordance with ARM 4 – Worked Examples. 10.21427/ww1j-7v27

This Other is brought to you for free and open access by the School of Surveying and Construction Management (Former DIT) at ARROW@TU Dublin. It has been accepted for inclusion in Other Resources by an authorized administrator of ARROW@TU Dublin. For more information, please contact [arrow.admin@tudublin.ie](mailto:arrow.admin@tudublin.ie), [aisling.coyne@tudublin.ie](mailto:aisling.coyne@tudublin.ie), [vera.kilshaw@tudublin.ie](mailto:vera.kilshaw@tudublin.ie).

# Composing Descriptions for Bills of Quantities in Accordance with ARM 4 – Worked Examples

Tony Cunningham  
School of Surveying and Construction Management  
Dublin Institute of Technology, Bolton Street, Dublin 1

## Introduction

Two basic skills are at the heart of the measurement process: quantification and description. Descriptions answer the question, what is it? This paper examines the process of composing descriptions for bills of quantities measured in accordance with the ARM4 (Agreed Rules of Measurement). This process involves ‘translating’ design information contained in models, drawings and specifications into bill descriptions in order to enable tendering contractors to accurately price the work. The quantity surveyor’s task is to effectively communicate the cost significant information so that the estimator can visualise what is being described.

Descriptions contained in bills of quantities measured in accordance with ARM are formally regulated by its rules. The purpose of ARM is set out in its opening sentence, which states that “*These Agreed Rules of Measurement provide a uniform basis for measuring building work and embody the essentials of good practice.*” Quantity surveyors must, therefore, provide the required information in a prescribed and structured manner within the bills of quantities.

This paper is primarily addressed to quantity surveying and construction students studying introductory modules in building measurement or quantity surveying studies. The author demonstrates how ARM is applied to compose descriptions of typical ‘basic’ work items from a range of work sections which are typically encountered during the course of an introductory quantities module. Examples of excavation, concrete, brickwork, blockwork, and woodwork descriptions are presented. It is hoped that the worked examples will enable the reader to apply the principles to other situations.

## Describing building work

The requirement to measure work in accordance with ARM distinguishes this form of measurement from other approaches where ‘formal’ bills of quantities are not used. It should be noted at this point, that there is range of approaches to procuring building work and that the use of bills of quantities is closely associated with the so called ‘traditional’ procurement route, where the employer provides the design. There are two categories of contract within the traditional approach: those let on a ‘*with quantities*’ basis - where bills of quantities are provided, and those let on a ‘*without quantities*’ basis - where bills of quantities *may not* be provided. Historically, without quantities contracts were confined to

‘minor works’ contracts, however nowadays their use is more widespread. Where they are used, the tendering contractors, themselves, quantify the works indicated on the drawings and in the specifications. The quantities so produced are often in the format of an abridged ‘builder’s bill’ which is rarely produced in accordance with ARM<sup>1</sup>. Other procurement approaches such as design-build use alternative pricing documents such as contract sum analyses and, likewise, these are not governed by ARM.

Rule A4 of ARM sets out the primary function of bills of quantities which ‘*shall fully describe and accurately represent the quantity and quality of the work to be carried out. Work which cannot be measured shall be given as a Provisional Sum.*’ The key words, here, are *fully* and *accurately*. It is important, therefore, that bill descriptions are carefully drafted, are comprehensive in the information to be provided, and are also accurately classified according to the applicable categorisation rules. Missing information and/or incorrect categorisation has the potential to lead to variation claims and/or costly disputes during the construction phase. In addition ARM requires additional information to be given ‘*where necessary in order to define the precise nature and extent of the proposed work*’. The need to provide such extra information, it is suggested, should only arise in unusual situations - as to do so in routine situations would appear to undermine the purpose of ARM in providing a ‘uniform’ basis for measuring building work.

Bill descriptions set out the physical and/or the performance characteristics of the particular work items. They contain, in effect, the cost significant aspects of the material specification and workmanship standards, and represent the minimum standards to be achieved. Descriptions typically include the kind and quality of the materials to be used and often contain limitations or requirements on how these are to be installed. Characteristics such as the size, strength, shape, finish, composition or performance requirements may need to be given. Descriptions may also identify the function, purpose or location of the particular items.

Rule A6 of ARM sets out the scope of bill descriptions. These comprise and are deemed to include:

- ‘*Labour and all costs in connection therewith*’, which covers all things necessary for the installation and manufacture of the work items.

---

<sup>1</sup> *The Liaison Committee Code of Practice for Tendering & Contractual Matters 2006* advocates that where a contract is let on a ‘with quantities’ basis that ‘*bills of quantities should always be issued as tender documents*’. The Committee notes that ‘minor works’ contracts may be let on a ‘without quantities’ basis in which case it recommends that a bill of quantities or schedule of items should be included in the tender enquiry.

- *‘Materials, goods and all costs in connection therewith’*, which includes the supply of all materials associated with the work items.
- *‘Assembling, fitting and fixing materials and goods in position’*, which caters for the physical installation of the work items.
- *‘Plant and all costs in connection therewith’*, which covers the tools and plant items associated with carrying out the work.
- *‘Waste of materials’*, covers the wastage which needs to be incorporated into the estimator’s rates.
- *‘All cutting’*, relates to cutting of material other than curved or diagonal cutting.
- *‘Establishment charges, overheard charges and profit’*, relates to the contractor’s apportionment of indirect costs and margins to cover the contract. (Keily and Kelly, 2003)

Where dimensions are contained in bill descriptions these should be presented in the sequence of length, width and height. Where that sequence might be inappropriate or ambiguous the dimensions should be specifically identified. Dimensional descriptions should include sufficient dimensions to identify the shape of the object. Where items are enumerated descriptions typically contain three dimensions; linear items typically contain two - identifying the cross sectional dimensions, and superficial items typically contain one dimension indicating its thickness or depth.

### ***Application of Tabulated Rules***

The Agreed Rules of Measurement are set out in the following work sections: General Rules, Preliminaries, Demolition and Alterations, Excavation and Earthwork, Piling, Concrete Work, Brickwork and Blockwork, Stonework, Roofing, Cladding and Waterproofing, Woodwork, Steelwork, Metalwork, Mechanical Installations, Electrical Installations, Floor, Wall and Ceiling Finishings, Glazing, Painting and Decorating, Drainage, Surface Pavings, Fencing and Landscaping, and Fittings, Equipment and Furniture.

Apart from the General Rules and Preliminaries sections, ARM is set out in tabular format across the width of two pages. The tables regulate how the various works are to be measured and described. The tables are set out in three distinct sections: information required; category tables, and what might be referred to as ‘supplementary rules’. This paper seeks to explain how to describe work. This involves providing the specific information required and applying the categorisation rules to reflect the particular

details. The ‘supplementary rules typically cover measurement procedures and are generally not referred to in the description process.

### *Information Required*

At the start of each work section preliminary rules apply. The purpose of these rules is to set out the information which must be given at the start of each work section to locate and define the work. The ‘*Information Required*’ section generally enables surveyors to compose concise specification headings which refer to the various types of work set out in the subsequent ‘*Category Tables*’. In many cases, certain particulars may be given in preamble clauses in a separate section of the bill or at the start of the particular bill element or work section. On other occasions, particulars set out in the Information Required section will not apply to the particular project, and in these situations, may be ignored. For example when measuring in-situ concrete, there may be no limitations required on the pouring, compacting, curing or waterproofing of the concrete, alternatively these particulars, where required, may be cross referenced to particular preamble or specification clauses.

The information requirements section applies to all subsequent rules until superseded by another set.

In many instance the information required section calls for location drawings. These are usually identified in the Preliminaries section of the bill, or are provided on further drawings which accompany the bill.

### *Classification Tables*

The Classification Tables on the left page of the table, contains four category columns and identify the units under which the work must be measured. Horizontal lines (stepped in some cases) divide the pairs of Work Section pages into mutually exclusive zones to which different rules apply. Where the horizontal line across a column is dashed the Rules of the zones immediately above and below it may apply as alternatives.

The Category 1 column lists descriptive features commonly encountered in building works and often defines a material’s location or function. Categories 2, 3, and 4 list further sub-groups into which the main items are divided. Category 2 often identifies size, thickness or cross sectional area classification ranges of the particular work items. Category 3 may identify additional cost significant characteristics necessary to complete a precise description, while Category 4 identifies further complicating factors which would give rise to additional cost implications.

No more than one requirement from each of the Category 1, 2 and 3 columns can be applied in one description. As many requirements, if any, of the Category 4 column as are applicable to the item of work shall be selected from the Category 4 column.

For example, Category 1 relating to brickwork classifies work as either: ‘Walls in trenches; Walls; Isolated columns; Isolated casings, or Chimneys.’ Category 2 rule requires different wall thicknesses to be measured separately. Category 3 is blank and therefore requires no further descriptive input. Category 4, however, identifies five instances in which the work must be separately measured: curved work; work tapering on one face; work tapering on both faces; work built against other work, and work bonded to other work, giving details.

*Supplementary Rules*

These rules are set out on the right hand page of the tables. They comprise Measurement Rules, Measurement Scope and Deemed to be Included items

The *Measurement Rules* set out when work shall be measured and the method by which quantities are computed.

The *Measurement Scope* defines the extent and limits of the work represented by a word or expression used in the rules and in a bill of quantities.

The *Deemed to be Included* section draws attention to particular incidental work which shall be deemed to be included in the appropriate items in a bill of quantities. Such works ‘shall neither be measured separately nor included in descriptions’. Note, however, that ‘Where there are specific requirements for such work, they shall be stated. Figure 1 below illustrates how the Tables are used

| Title of Work Section |               |               |               |      | Title of Work Section |                      |                          |
|-----------------------|---------------|---------------|---------------|------|-----------------------|----------------------|--------------------------|
| Information Required  |               |               |               |      |                       |                      |                          |
| Category<br>1         | Category<br>2 | Category<br>3 | Category<br>4 | Unit | Measurement<br>Rules  | Measurement<br>Scope | Deemed to be<br>Included |
| 1                     | 5             | 8             | 12            | 16   | M1                    | S1                   | D1                       |
| 2                     |               | 9             | 13            |      | M2                    | S2                   |                          |
| 3                     | 6             | 10            | 14            | 17   |                       | S3                   | D2                       |
| 4                     | 7             | 11            | 15            | 18   | M3                    | S4                   | D3                       |

Fig 1 ARM Tabular Rules. Adapted from Keily and Kelly (2003)

Items in zone 1 are sub-categorised where required by zones 5 and 8 and state the applicable supplementary information in zone 12. They are measured in the units stated in zone 16 and are subject to the additional rules, scope and coverage matters indicated in zones M1, S1 and D1.

Items in zone 2 are sub-categorised where required by zones 5 and 9 and state the applicable supplementary information in zone 13. They are measured in the units stated in zone 16 and are subject to the additional rules, scope and coverage matters indicated in zones M2, S2 and D1.

Items in zone 3 are sub-categorised where required by zones 6 and *either* 10 or 11 and state the applicable supplementary information in zone 14. They are measured in the units stated in zone 17 and are subject to the additional rules, scope and coverage matters indicated in zones M2, S3 and D2.

Items in zone 4 are sub-categorised where required by zones 7 and either 10 or 11 and state the applicable supplementary information in zone 15. They are measured in the units stated in zone 18 and are subject to the additional rules, scope and coverage matters indicated in zones M3, S4 and D3.

### ***Detailed Descriptions***

ARM4 contains numerous instances requiring a ‘detailed description’ to be provided. In many such instances, joinery for example, it is more pragmatic to provide a reference to drawn information or to a bill diagram. Rule A7 permits this approach to describing work, thereby avoiding the need to draft lengthy written descriptions of the particular item. Likewise, this rule allows manufacturer’s standard products to be described by providing a precise reference to a catalogue.

Drawings may be produced which relate to ‘composite items’, which may be manufactured off site. Such work may be billed as a single item which may incorporate a number of individual components which otherwise would be measured separately. Such drawings, or descriptions, however, must *fully* describe the various components of the particular item. It should be noted that where a bill description conflicts with a drawing that the drawn information will take priority. If a discrepancy is found in a Bill item it must be adjusted in accordance with the drawing or executed work.

### ***Drawn Information***

ARM Rule A8 deals with drawn information which may be provided to support bill descriptions. Location drawings include the site location plan indicating the position of the site, ideally relating this to a town plan or other context. General arrangement drawings typically provide this positional information; comprising the individual floor plans, elevations and principal sections through the building. Component drawings are fabrication or workshop drawings which detail the necessary parts of the item to allow construction and/or production. Bill Diagrams aid the description of the item and

should fully define or describe the work necessary to construct the item and as such can be simply referenced in the bill description.

## The Worked Examples

### Section D- Excavation and Earthworks

The rules governing the measurement of excavation and earthwork are set out in Section D of ARM. This section covers ground investigation, excavation and underpinning. Fig 2 is an extract from Page 22 of ARM which contains the rules for measuring excavation works. The following example, Fig 3, demonstrates how to compose a topsoil strip description and a follow-on trench excavation description. Both are likely to be among the first items to be measured by novice quantity surveying students.

#### Excavation and Earthwork: Excavation

##### INFORMATION REQUIRED

- ▶ Ground Investigation Reports indicating the nature of the ground.
- ▶ The ground water level and date when established (pre-contract level).
- ▶ Ground water subject to periodic changes such as tidal effects.
- ▶ Trial pits or bore holes stating their location.
- ▶ Over or underground services.
- ▶ Nature of contaminated or hazardous materials arising from excavations and requirements for disposal.
- ▶ Location Drawings which shall show existing features, buildings, services and the like, indicating those for retention.
- ▶ Materials for filling and details of compaction.

▶ Limitations on methods of execution.

| CATEGORIES    | 1   | 2   | 3   | 4 | Unit           |
|---------------|---|---|---|---|----------------|
| 1 Removing    | 1 trees<br>2 tree stumps  | 1 girths<br>≤ 0.45m<br>>0.45 ≤ 1.5m<br>>1.5 ≤ 3.0m<br>>3.0m; girth stated | 1 filling material where not at Contractor's discretion |   | nr             |
|               | 3 hedges  |   |   |   | m              |
|               | 4 site vegetation   |   |   |   | m <sup>2</sup> |
| 2 Preparation | 5 lifting sods  | 2 method and depth stated   |   |   |                |
| 3 Excavation  | 6 topsoil for preservation  | 3 average depth stated  |   |   |                |
|               | 7 reduce levels<br>8 basements<br>9 foundation trenches<br>10 isolated pits (nr)<br>11 pile caps (nr) | 4 maximum depth<br>≤ 2.00m<br>> 2.00m in 2 m stages                       |   |   | m <sup>3</sup> |

Fig 2 Extract from ARM4 setting out excavation and earthworks rules of measurement.



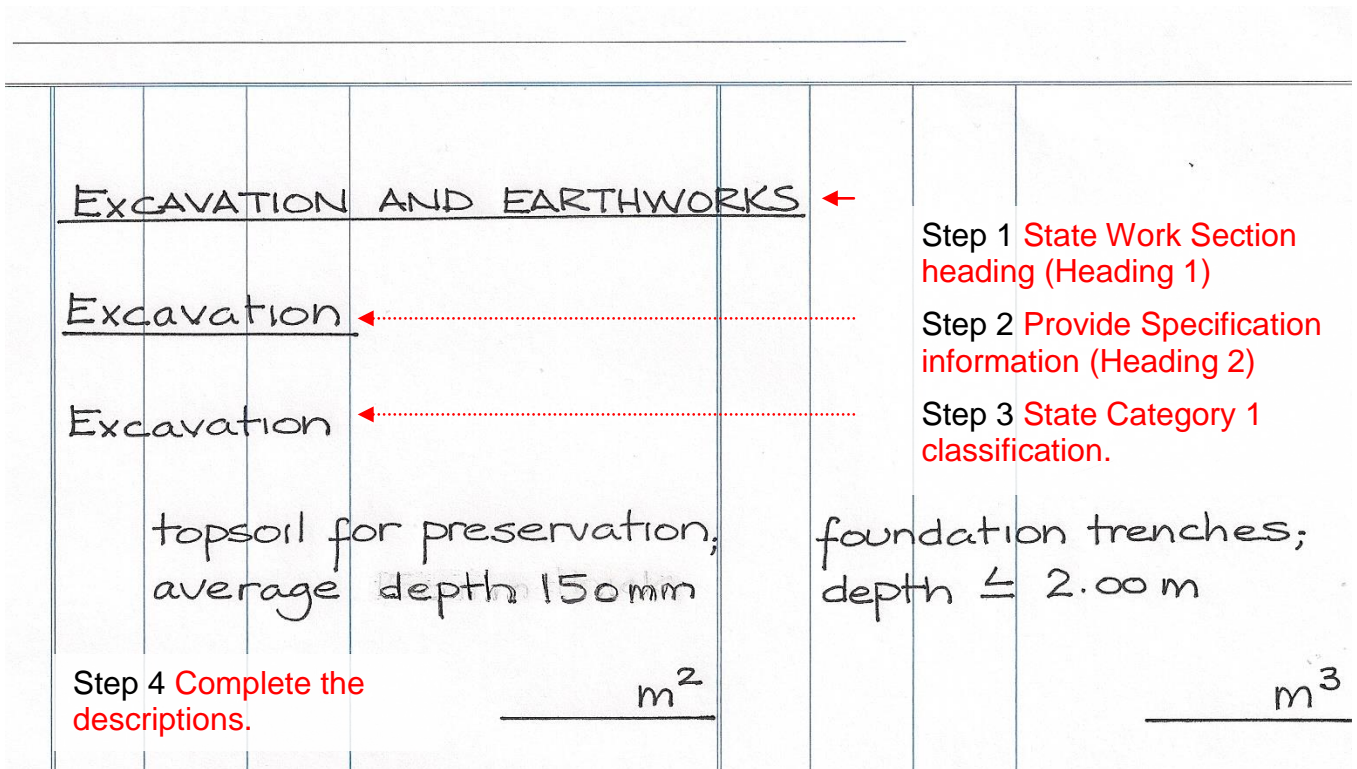


Fig 3 Example of topsoil strip and trench dig descriptions.

Step 1 - State the **Work Section Heading**. This is commonly referred to as a 'level one heading' and is typically aligned to the left of the timesing column and is handwritten in underlined capitals<sup>2</sup>. The level one heading governs all work all subsequent work in the excavation and earthwork work section. Its scope ceases with the measurement of following work section, in most cases this would be concrete work.

Step 2 – Provide the **Information Required**. The information required is often called a specification heading or a 'preamble' and is typically presented as a 'level two heading'. This is usually aligned to the left of the timesing column and handwritten in underlined lower case text<sup>3</sup>. In the case of excavation, comprehensive site investigation details must be provided and these are typically provided in notes to the contractor at the start of the section. In the interest of simplicity these have not been presented here – (see endnote 1<sup>1</sup> for an explanation of these requirements). As excavation has no material specification *per se*, no further details other than the heading 'Excavation' need be stated.

Step 3 – State which **Category 1** classification applies. Pages 22-25 of ARM contains eight 'Category 1' classifications: i) Removing; ii) Preparation; iii) Excavation; iv) Extras on excavation items, v) Working

<sup>2</sup> – in printed text this is often presented in uppercase bold type.

<sup>3</sup> – in printed text it would be in lowercase bold type.

space; vi) Disposal; vii) Filling, and viii) Surface treatments. Stripping topsoil and excavating trenches are within the scope of the 'Excavation' classification. This is typically aligned to the left of the timing column and handwritten in plain lower case text.

Step 4 – *Complete the description*: This is performed by selecting the appropriate sub classifications in the associated Category 2, 3 and 4 columns. The various sub-classifications must be measured separately from each other. As many requirements, if any, of the Category 4 column as are applicable must be stated in the description. In this instance, descriptions for preserved topsoil must state its average depth and is measured in m<sup>2</sup>. Likewise the foundation trench excavations are further classified as being: not exceeding 2.00m deep and are measured in m<sup>3</sup>. In both instances there are no further Category 4 requirements. Note that the final descriptions have been indented and aligned with the dimension column.

### Work Section F- Concrete Work

Fig 4 below sets out the rules for measuring in-situ concrete work. The worked example in Fig 5 shows the build up of a blinding and a foundation description.

#### Concrete Work: In-Situ Concrete

##### INFORMATION REQUIRED

- ▶ Location Drawings.
- ▶ Kind and Quality of materials; performance or mix details; tests.
- ▶ Limitations on method of pouring, placing compacting and curing.
- ▶ Method of waterproofing.

| CATEGORIES  | 1 | 2 | 3 | 4   | Unit           |
|---|---|---|---|---|----------------|
| 1 General Rules   |   |   |   |   |                |
| 2 Blinding<br>3 Bulk filling<br>4 Foundations<br>5 Ground beams<br>6 Isolated foundations |   |   |   | 1 reinforced<br>2 poured on or against earth or unblinded hardcore<br>3 waterproofing | m <sup>3</sup> |

**Fig 4 Extract from ARM4 setting out in-situ concrete rules of measurement.**

|  |  |  |  |                                |  |  |  |
|--|--|--|--|--------------------------------|--|--|--|
| <u>CONCRETE WORK</u>                                   |  |  |  | <u>In situ concrete; grade</u> |  |  |  |
| <u>15 N</u>  |  |  |  | <u>30 N</u>                    |  |  |  |
| Blinding   |  |  |  | Foundations                    |  |  |  |
| poured on or against<br>earth or unblinded<br>hardcore |  |  |  | reinforced.                    |  |  |  |
| <u>m<sup>3</sup></u>                                   |  |  |  | <u>m<sup>3</sup></u>           |  |  |  |

**Fig 5 Examples of concrete blinding and foundation descriptions**

*Section Heading (Level 1 Heading)*

In situ concrete work is measured in m<sup>3</sup> in accordance with section F of ARM. The level one heading, CONCRETE WORK, is stated at the top of the dimension sheet. This heading governs all the subsequent concrete work and does not need to be restated on each page.

*Information required headings*

Concrete specification headings require the kind and quality of materials, performance or mix details and tests to be stated. Descriptions usually state the strength of the concrete rather than mix proportions. For example foundations may be described as 30N (Newton). ARM information requirements regarding waterproofing or limitations on placing concrete are assumed not to apply in these worked examples. Many quantity surveying practices arrange the billing of in-situ concrete in order of increasing concrete strength. This demonstration features two different grades of concrete, grade 15N and grade 30N which are arranged in order of increasing strength, and hence expense.

*Category 1 heading*

In situ concrete is categorised under 19 separate Category 1 (functional) classifications, of which blinding and foundations are the subjects of this demonstration.

*The completed descriptions*

No further sub-classification of either the blinding or the foundations is required by the Category 2 and Category 3 columns. However, the Category 4 column requires the blinding to be described as *poured on or against earth or unblinded hardcore* to alert the tendering contractors that formwork has not been measured to the sides of the foundations and, therefore, a greater degree of waste is envisaged. Likewise the Category 4 column requires the concrete foundation to be described as *reinforced* which is more difficult to place.

**Section G - Brickwork and Blockwork**

**Brickwork and Blockwork: Brickwork/ Blockwork**

**INFORMATION REQUIRED**

- ▶ Location Drawings.
- ▶ Kind, quality and size of bricks and blocks.
- ▶ Type of bond.
- ▶ Composition and mix of mortar.
- ▶ Surface finish.
- ▶ Type of pointing.
- ▶ Composition and mix of mortar for pointing if different from that in the body of the work.
- ▶ Purpose made bricks or blocks.

| CATEGORIES   | 1           | 2 | 3 | 4   | Unit           |
|--|-------------|---|---|---|----------------|
| 1 General Rules  |             |   |   |   |                |
| 2 Walls in trenches<br>3 Walls<br>4 Isolated columns<br>5 Isolated casings<br>6 Chimneys | 1 thickness |   |   | 1 curved<br>2 tapering; one face<br>3 tapering; two faces<br>4 built against other work<br>5 bonded to other work, giving details | m <sup>2</sup> |

**Fig 6 Extract from ARM4 setting out brickwork and blockwork rules of measurement.**



| <u>BRICKWORK AND BLOCKWORK</u>   |   |
|--|---|
| <u>Brickwork; I.S. EN 771-1</u><br><u>2011; Old Dublin Brindle</u><br><u>(Ormonde Brick Ltd) 215 x 102</u><br><u>x 65 mm; stretcher bond;</u><br><u>In gauged mortar (1:1:6)</u><br><u>pointing with neat weather-</u><br><u>struck joints</u> | <u>Solid concrete blockwork;</u><br><u>I.S. EN 771-3 2011; 5N/mm<sup>2</sup></u><br><u>440 x 215 x 100 mm;</u><br><u>in gauged mortar (1:1:6)</u> |
| Walls  | Walls in trenches   |
| half brick thick; fair<br>face one side  | 100 mm thick  |
| <u>m<sup>2</sup></u>   | <u>m<sup>2</sup></u>  |
|  | 215 mm thick  |
|  | <u>m<sup>2</sup></u>  |

Fig 7 Examples of brick and block wall descriptions.

Brickwork and blockwork is measured in m<sup>2</sup> in accordance with Section G of ARM. The level one heading, BRICKWORK AND BLOCKWORK, is stated at the top of the dimension sheet.

#### Information required headings

The information required headings for brickwork and blockwork, in the majority of projects, specify the: kind, quality and size of bricks or blocks, the type of bond, the composition and mix of mortar, the surface finish, and the type of pointing. On rare occasions it may be necessary to include details of the composition and mix of mortar where this is be different from that in the body of the work. Where bricks or blocks are purpose made this must also be stated. The worked example of the brick description in this instance does not contain details of the fair face surface finish in the heading, - this information is contained later in the completed description (see below). Likewise, the specification for the blockwork contains no reference to surface finish or pointing, as this is not required in rising wall applications. Otherwise, absence of such information would indicate that the wall may be plastered or finished in some other manner.

*Category 1 heading*

General brickwork and blockwork is separately categorised as: walls in trenches; walls; isolated columns; isolated casings or chimneys. In this demonstration the brickwork is classified as ‘Walls’; the blockwork is classified as ‘Walls in trenches’.

*The completed descriptions*

The Category 2 column requires the *thickness* of the work to be stated, no further sub-classification is required by the Category 3 column. Category 4 applies where the work is: curved; tapering on one face; tapering on two faces; built against other work, and/or bonded to other work giving details – no such requirements have been allowed for in this demonstration. Note that the fair face surface finish of the brickwork which is normally required in the ‘information required’ heading has been moved to the final description to emphasise this aspect of the work. Note also that rewritten headings are not required for the follow-on description of the 225mm block rising walls.

**Section J Woodwork.**

**Woodwork: Structural and First Fixings**

**INFORMATION REQUIRED**

- ▶ Location drawings.
- ▶ Timber type, quality, preservative treatment, surface finish, fixings and jointing.
- ▶ Colour and/ or grain matching.
- ▶ Connectors, cleats, and the like.

| CATEGORIES       | 1   | 2                                 | 3   | 4 | Unit |
|------------------|---|-----------------------------------|---|---|------|
| 1 General Rules  |   |                                   |   |   |      |
| 2 Pre-fabricated | 1 trusses<br>2 trussed rafters<br>3 trussed beams<br>4 wall or partition panels | 1 detailed description            | 1 laminated construction<br>2 performance criteria on contractor designed items |   | nr   |
| 3 Carcassing     | 5 walls or partitions<br>6 floors or flat roofs<br>7 pitched roofs              | 2 cross-section dimensions stated | 3 length > 5.00m in one piece   |   | m    |
|                  | 8 joist strutting   |                                   | 4 herringbone   |   |      |

**Fig 8 Extract from ARM4 setting out woodwork rules of measurement.**

| <u>WOODWORK</u>  |   |
|--|---|
| Softwood; structural grade<br>C14, pressure treated with<br>preservative | 44 x 225 mm; length<br>> 5.00 m in one piece<br><hr/> m |
| Carcassing; floors or<br>flat roofs                                      |   |
| 44 x 225 mm<br><hr/> m   |   |

**Fig 9 Examples of wood joist descriptions**

Figure 9 above builds up descriptions of floor joists, some of which are over 5.00m in length and are required to be in one piece.

The measurement of woodwork is covered by section J of ARM. Section J contains four subsections: structural and first fixings; boarding and second fixings; composite items (joinery) and ironmongery, accessories and sundries. The example above relates to structural timber and is measured in linear metres. The level one heading WOODWORK is stated at the top of the dimension sheet.

#### *Information required headings*

The information required for structural timber must set out the following details: The *timber type, quality, preservative treatment, surface finish, fixings and jointing*. – These matters are the most important aspects of the specification and are covered in the specification headings in Fig 9 above. There are two main classifications of timber: hardwood and softwood. The timber species must be stated in the description and in the above example is specified as structural softwood, (white deal) with a quality specification of C14. There are a number of methods treating timber with preservative such as brush applied or vacuum impregnated treatments. Carcassing timber is usually sawn, that is, as it has left the sawmill; if the timber is subsequently planed and finished smooth it is described as ‘wrought’ or ‘wrot’. Where the surface finish is not identified it will be assumed to be sawn timber. Timber is deemed to be fixed with nails unless otherwise stated (nails include large carpentry nails and spikes). Other fixings methods include plugging and screwing, bolting; and bedding in mortar. Details of such fixings are often

contained in the completed description rather than in a heading in order to avoid redrafting of headings to cater for minor changes in specification. Where fixings are not identified these will be assumed to be at the discretion of the contractor.

The *location drawings* are typically the general arrangement drawings which accompany the bills of quantities and typically require no further reference. Surveyors may, nevertheless, include a separate preamble identifying the relevant drawings. *Colour and/or grain matching*. – There are no requirements for these in this worked example. *Connectors, cleats, and the like*. – These do not arise in this worked example. Connectors are often associated with pre-fabricated work such as roof trusses. A cleat is a strip fastened to one part to hold it in place or to facilitate the fastening of another part.

### *Category 1 heading*

Structural timber is classified in the first instance as: Pre-fabricated, *Carcassing*, First fixings and Labours. This worked example relates to carcassing timbers which are subcategorised (Category 2) as being in walls or partitions, *floors or flat roofs*, or pitched roofs. In Fig 9 the floors or flat roofs sub-category has been hooked onto the carcassing heading as this sub-category often covers several timber sizes.

### *The completed descriptions*

Category 3 requires the cross-section of the timber to be stated. Note that the function of the member, such as joists trimmers, plates or beams, is not stated in the description, - this means that the scope of a single description may cover various members performing different structural functions, provided they share a common cross sectional size. The second description covers members which are governed by the Category 4 requirement to identify timbers which are over 5.00m in length and are required to be in one piece.

## **Coding Bill Descriptions**

It is possible to code bill descriptions by cross-referencing descriptions with the Category tables. This process may be used to automate bill descriptions for software applications. The coding involves identifying the ARM section, page number, and the appropriate numbers from the four category columns. For example the reference for the topsoil description in the worked example is D22.3.6.3.0. D22 refers to the ARM page number; 3 is the Category 1 classification; 6 is the Category 2 classification; 3 is the Category 3 classification; the digit 0 indicates that there are no entries in the column in which it appears. Likewise, the foundation trench code is D22.3.9.4.0; the concrete blinding is F36.2.0.0.2; the concrete foundation is F36.4.0.0.2 and so on.



## In Summary

ARM sets out the rules and information required to describe and measure building work. These rules are agreed between the professional bodies representing contracting organisations and quantity surveyors and are considered to provide sufficient detail to enable contractors to accurately price the various items of building work. The information required and categorisation details are regarded as the minimum requirements to achieve this objective. Hore, Scully and O’Kelly. (2009) comment that ‘*considerable care and skill are required to frame adequate, and yet at the same time, concise descriptions. This is probably the most difficult aspect of taking off work and one which the student should take great pains to master. . . . Where there is doubt in the mind of the estimator as to the full nature and/or extent of the item being priced, then the description is lacking in some essential feature.*’

These worked examples demonstrate an approach to composing bill descriptions which has been informed by twenty years experience in several prominent quantity surveying practices. It is acknowledged that individual companies have their own ‘house’ style for presenting bills of quantities and that these differ from office to office. The order of descriptions should follow the Category classifications of ARM. The worked examples, however, indicate that, where appropriate, it is possible to adapt and restructure the information requirements and classification tables to better reflect the individual circumstances, provided of course, that all the necessary information is presented somewhere in the description.

## References

- The Construction Industry Federation and the Society of Chartered Surveyors (2009) *Agreed Rules of Measurement 4<sup>th</sup> Edition* Dublin, CIF and SCS.
- Hore, A. O’Kelly M and Scully R (2009) *Seeley and Winfield’s Building Quantities Explained Irish Edition*. Basingstoke, Palgrave Macmillan
- Keily, P and McNamara, P (2003) *SMM7 Explained and Illustrated*. Coventry, RICS Books.

---

<sup>i</sup> Excavation is one of the most significant areas of financial risk for both clients and contractors and Section D of ARM requires the contractor to be supplied with comprehensive information regarding ground conditions in order to accurately price this work. The information required to support excavation descriptions includes: Ground Investigation Reports indicating the nature of the ground; the ground water level and the date when established; ground water subject to periodic changes such as tidal effects; trial pits or bore holes stating their location; over or underground services; handling and disposal of dangerous materials arising from the excavations; location drawings which shall show existing features, buildings, services and the like, indicating those for retention; materials for filling and details of compaction; limitations on methods of execution.

---

Typically this information is contained in a site investigation report, which is sent out with the tender documents to the tendering contractors. Where no such report exists, a description of the assumed ground strata must be supplied, otherwise the tendering contractors are entitled to assume favourable or trouble free ground conditions.