Practical Demonstration of the use of BESMM4 in Measurement and Billing of Building Works

A paper presented by

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Abstract

Building and Engineering Standard Method of Measurement fourth edition (BESMM4) provides the fundamental guidance for detailed measurement and description of Building, Engineering and Industrial works for the purpose of obtaining a tender price. The emergence of new method of Construction due to modern technology, the need for provision of precise cost information and reduced cost of construction, management of risks associated with construction works necessitates the new BESMM4. The document review and correct ambiguities, errors in text or context, duplications in previous edition and incorporate additional rules deemed necessary to enable the document serve its purpose more effectively. The paper summarized the rules of measurement and description for building works and demonstrate the use of BESMM4 in measurement and billing of building works. The paper concluded that the new BESMM4 permits local content in enhancing cost management of construction projects and meet global best practice alongside the principles of similar international standard.

1.0 Introduction

Brief history of Standard Method of Measurement (In Nigeria)

The first edition of SMM was published in 1988 known as SMMBWS (Standard Method of Measurement of Building Works and Services) and was revised in 1996 as first impression

In 2002, BESMM 2 was published, known as Building and Engineering Standard Method of Measurement, second edition, with the introduction of coding system for references.

In 2008, BESMM 3 was published (Known as Building and Engineering Standard Method of Measurement, third edition) also with coding system for ease of use with AutoCAD and QS software. BESMM 3 served as correction to BESMM 2.

BESMM 4, published in 2015 for effective take-off in January 2016, is the review of BESMM 3 with the aim of correcting all the errors in text or context, i.e. typographical; inserting and omissions, removal of unnecessary features, rearrangement of contexts and features incorporating additional rules deemed necessary and to enable the document serve its purpose more effectively. BESMM 4 was designed to meet the global best practice alongside the principles of similar international standard methods of measurement (such as NRM2, CESMM 4 and ISMM).I incorporate all the work items in part 2 (civil and industrial engineering) without cross reference to part 1 (building and the likes).

Why do we measure?

We measure mainly for the purpose of producing Bill of Quantities (BoQ). According to BESMM4 (2015), bill of quantities is a contract document that fully describe and accurately represent the quantity and quality of work to be executed. The BoQ primarily provides;

- A co-ordinated list of items, together with their identifying description and quantities to enable contractors prepare tenders efficiently and accurately.
- Basis for valuation of work for the purpose of making payments (Mobilization payment, interim payment, final account payment).
- Basis valuation of varied work, etc.

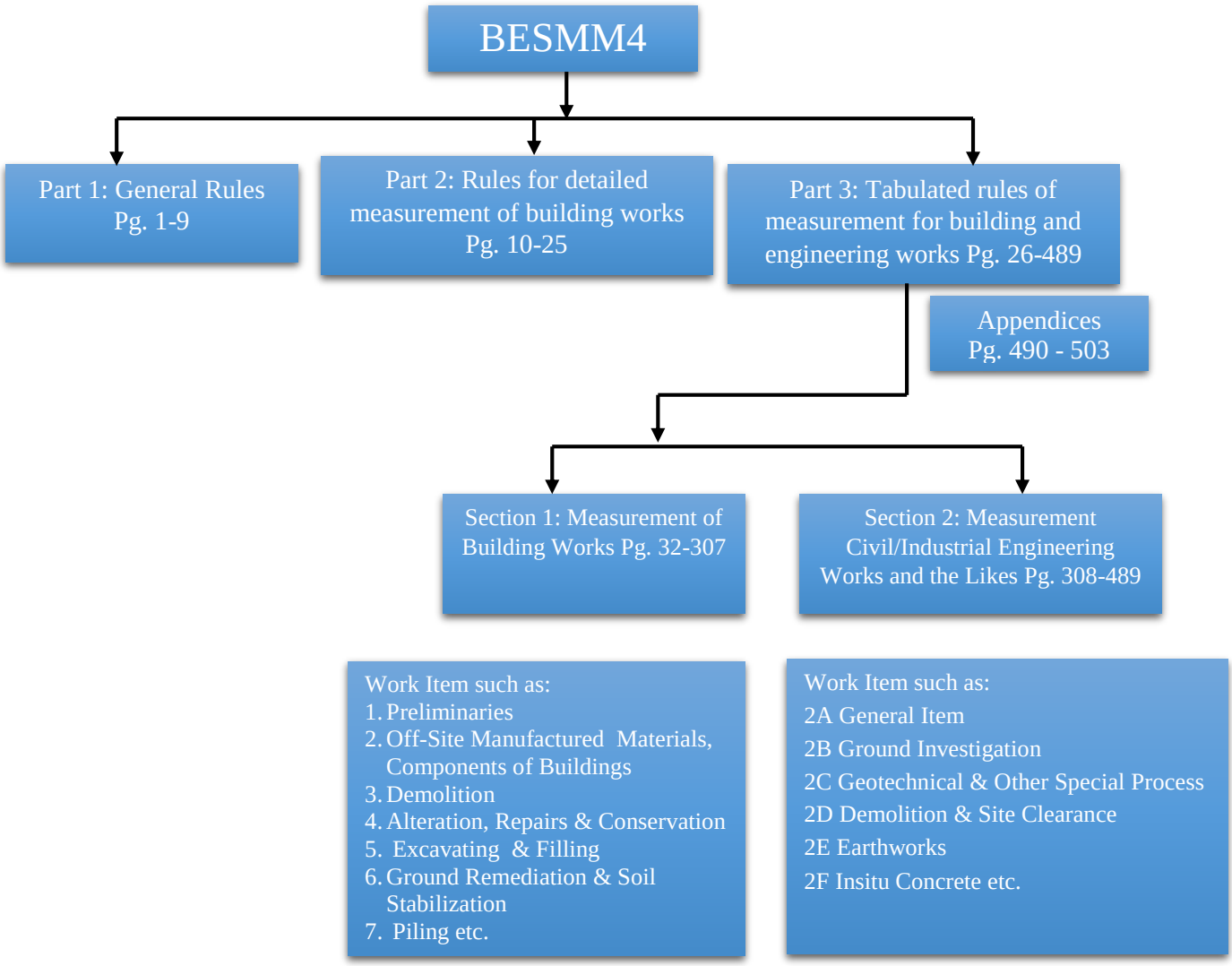
Based on these reasons, BESMM 4 aims at;

- Providing a uniform guidance for measurement of building and engineering works for the preparation of bill of quantities and to achieve high level of accuracy of measured work
- To assist in the accurate preparation and analysis of tenders with BoQ measured on a uniform basis
- To provide a basis for cost/value control of the project in line with the conditions of contract used, making all necessary provisions in the descriptions and quantities of work.
- To provide a unified single document which encourage good practice in the measurement of building and engineering works.
- To provide guidance on the effective communication of information relative to quantities of work to be executed and description of such work

The structure/composition of BESMM4 and BoQ.

The BESMM4 is divided into three main section with supporting appendices for the purpose of measurement; namely:

Part 1: General Rules (page 1-9)
Part 2: Rules for detailed measurement of building works (page 10 -25), and;
Part 3: Tabulated rules of measurement for building and engineering works (page 26-489)



Part 1: General rules (pg. 1-9)

- "Bills of quantities shall fully describe and accurately represent the quantity and quality of the work to be carried out. More detailed information than is required by the rules shall be given where necessary in order to define the precise nature and extent of the work required" (Clause 1.1)
- Explained classification tables.
- Explained supplementary rule, that is, Measurement rules, Definition Rules, coverage rules and Supplementary information.
- Quantities, Descriptions, Drawn information, among others.

Part 2: Rules for detailed measurement of building works (pages 10-25): The section outlined

- The purpose and benefits of Bills of Quantities,
- Explained the different types of bills of quantities and preparation of bills of quantities,
- Describes responsibility for quantifying building works under various procurement option,
- Outlines components of BoQ and works under preliminaries,

Part 3: Tabulated rules of measurement for building and engineering works (pages 32 – 489): The section

- Explained the use of tabulated rule for measurement of building works,
- Explained the use of tabulated rule for measurement of preliminaries,
- Comprises the rules of measurement for building component in Work section 2 – 40.

Bill of Quantities (BoQ) based on BESMM4 comprises of the following sections.

- Form of Tender
- Summary (or Main Summary)
- Preliminaries – 2 sections
  - * Information and requirements, and
  - * Pricing schedule
- Measured work (Incorporating Contractor designed works)
- Risks
- Provisional Sums
  - *Defined
  - *Undefined
- Dayworks (provisional); and
- Annexes

BESMM4 Tabulated Rules of Measurement of Building Components/ Items

The tabulated rules in this section relates to work sections 2 to 40 comprising the rules for measurement of building components / items as highlighted in paragraph 3.2.3.1 and 3.2.3.2 of the BESMM4 (page 27 and 28). Each table is headed by the title of the work section concerned such that the first two rows set out the followings:

a) drawn information required in respect of to each work section to enable measurement and shall accompany BoQ when issued,
b) mandatory information that is to be provided in each section,
c) minimum information that shall be required on the drawing or any other document that accompany each work section; and,
d) Works and materials that not measured, but are deemed to be included in the building components/items measured in each section.

The table is structured as follows:

- Column 1 (items) - lists the components/descriptive features commonly encountered in building works.
- Column 2 (unit) - lists the unit of measurement for building components/items.
- Column 3 (first division) - lists the information, including any dimension required in the component/item descriptions.
- Column 4 (second division) - lists the supporting information, including any additional dimension requirement, that shall be included in the item description.
- Column 5 (third division) - lists other supporting information including any additional dimension required in the item description; and.
- Column 6 (measurement rules, definition rules, coverage rules and supplementary information that may be required) - explains the works that are deemed to be included in the measured item; clarifies the approach to quantification and description of items; and defines specific terms/phrases used in connection with the measured items/components.

Other general rules includes:

a) The rules are written in present tense.

b) The symbol (‘/’) used between two or more units of measurements or within text, means ‘or’.

c) Horizontal lines (__) divide the tables and rules into zero to which different rules apply.

d) Where the units of measurement or rules are separated by a broken line (---) this denotes a choice of units or choice of ways of measurement. The method chosen shall be the best to suit the particular situation.

e) The use of hyphen (-) or the phrase ‘to’ between two dimension in these tables or in a BoQ means a range of dimension exceeding the first dimension stated but not exceeding the second.

BESMM4 Referencing / Coding of work item.

Each work item may be referenced or numbered by using a compound number comprising the 'Work Section' reference number and the numbers identifying the works item from each of the columns of the Classification Tables

1.14.02 Cross reference within the .classification tables are given in the form:

A 'colon' separates the Work Section reference number from the numbers in the Classification Tables which are themselves separated by a dot.

e.g

Work Section Number:	Number from first column	Number from second column	Number from third column	Number from fourth column
1.5:6.2.1				

Excavating and Filling;
Excavation, commencing from strip level;
Foundation excavation
Not exceeding 2m deep.....m^3

Alternatively,

Cross references within the classification table in columns 1-3 may be stated without the dots except in the case of numbers consisting of two digits (i.e. 10 and above) a slash (/) shall be used after the numbers of the first three columns before stating the number of the fourth colomn.

E.g. (page 170)

Work Section Number:	Number from first column	Number from second column	Number from third column	Number from fourth column
1.14:1.633/0				

Damp proof course ≤ 300mm wide;
25mm thick, in two layers;
Horizontal ……...m.

1.14.3 An asterisk with a cross reference represents all entries to the column in which it appears.

1.14.4 The digits, 0 without a cross reference represents no entries in the column in which it appears.

1.3.4 Each item description shall identify the work with respect to one descriptive feature drawn from each of the first three columns in the classification tables and many of the descriptive features in the fourth column are applicable to the column provides for further division.

2.0 Practical Demonstration of the use of BESMM4 for Measurement of Building Works

			1.5 : EXCAVATING AND FILLING **Preliminary site work,**	**D : GROUND WORK. D20 : Excavating and Filling.**
A	Item		**(1.5:1.1.1/2) or (1.5:111/2)** Service, max depth 900mm , upvc water supply pipe, location left to the discretion of the contractor. **(BESMM4, Page 118)**	**Note:** No Provision for this item of work in BESMM3**.** Cross referencing between classification table **(Rule 1.14.02, Page 5 of BESMM4)**
B	Nr		**(1.5:1.2.1/2) or (1.5:121/2)** Preliminary site work, Trial pits to locate existing services , max depth 1.2m , at the discretion of the contractor. **(BESMM4, Page 118)**	**Note:** No Provision for this item of work in **BESMM3**
			or	
C	Nr		**(1.5:1.3.1*2/1*2)** Preliminary site work, Borehole to determine ground condition ,150mm diameter.,36.00m max. depth, core samples to FedPolyIlaro soil test laboratory for Geotechnical reports. **(BESMM4, Page 118)**	**Note:** No Provision for this item of work in **BESMM3**

A			**Removing Trees** **(1.5:2.1.1)**	**Note: as contained in BESMM3 (D20:1.2.1*2*3)**
	Nr		Removing Trees, Grubbing up roots and disposal ,girth between 500mm-1.50m filling void with matl arising from excn.	Site preparation, removing trees , Grubbing up roots and disposal girth, between 600mm - 1.5m,1.5-3.00m and greater than 3.00m classifications.
B			**(1.5:3.3.1)**	
	Nr		Removing Trees stumbs, girths 3.00 - 4.5m; grubbing up roots and disposal off site all mtl's and filling void with matl arising from excn. **(BESMM4, Page 118)**	**Note:** **BESMM4: S**eparate provision for removing tree stumb**.**

A			**Site Clearance** **(1.5:4.1.1)**	**Note:** as contained in BESMM3 **(D20:1.3.4)**
	m2 -		Site clearance., clearing site vegetation and other growths and dispose off, including trees and tree stumbs **less than 500mm girth,** hedges and shrubs, filling voids with matl arisg from excn. **(BESMM4, Page 119)**	Site prepn, clearing site vegetation, bushes, shrubs, undergrowth, hedges, trees, and tree stumps, **less than** 600mm girth, filling voids with matl arisg from excn.
B			**Site Preparation** **(1.5:5.2)**	**Note : as contained in BESMM4, page 120** *Other matls to be removed along with topsoil excn could be: -Hard Pavings and Specific items, *Hardcore under the hard pavings is treated as reduced level exvn (**Meauresmt Rule M9**). *Specific items are any existing items on site not specifically designated to remain, such as abandoned cars, fridges and the like but excludes Building Structures (Coverage Rule C8).
	m2 -		Site preparation ; Rem topsoil; 150mm average depth. **(BESMM4, Page 120)**	

			Excavation	
A			**(1.5:6.1.2)**	**Note: Measurement Rule M10, BESMM4 page 121:**
	m3		Excavation frm strip level, Bulk excn to form basement, over 2m but not exceedn 4m deep. **(BESMM4, Page 121)**	Classified Bulk excavation to include: *Reduced level excavation *Basement excavation *Pools & pond excavation and the like as Each may be measured and described separately for clarity and pricing.
B			**(1.5:6.2.1)**	**Note: M12/S6, page 122 of BESMM4:**
	m3		Excavation from strip level, foundation excn, not exceeding 2m, in strip foundation. **(BESMM4, Page 122)**	Classified Foundation excavation to include: *Strip Foundation *Pad Foundation *Pile Caps and all other types of foundations. Foundation Excavation may be measured and described for clarity and pricing. **BESMM3 :** Identified work items measured under Excavation as: *Topsoil for preservatn ; Reduced level excn.; Basement excn; Pit(nr); Trenches, width ≤0.30m and >0.30m etc. Also, classified max.depth as ≤ 0.25m, ≤ 1.00m, ≤ 2.00m etc.

			Disposal	
A			**(1.5:9.1.1)**	
	Item		Ground water; 300mm below original ground level. **(BESMM4, Page 124)**	
B			**(1.5:9.2.0)**	
	m3		Excavated matl off site. **(BESMM4, Page 125)**	
			Retained excavation.	
C			**(1.5:10.1.1*2)**	**Note: page 125 of BESMM4:**
	m3		Retaining exctd. topsoil on site, to temp. spoil heap ; avg .dist. 10m. **(BESMM4, Page 125)**	-The location of spoil heaps can be to the discretion of the contractor(Definitn Rule D8) -If specific handling is required on the exctd topsoil, then the coding is (1.5:10.1*2/1).

A			Item of work such as: *Level and compacting *Working space were removed from items of work measured. *__M18:__ Earthwork support has been simplified and only measured where specifically called for in the contract documents (specification). **(BESMM4, page 124)**	**BESMM3 :** All these items are provided for in BESMM3 but in most cases they arey are not carried out by the contractor on site.
B	m2		**Filling obtained from exctd material.** **(1.5:11.1.1*2)** Final thickness of filling not exdg 500mm, 450mm thick; Site, not excdg 1.0m around site, backfilling fdns; in layers of 300mm. **(BESMM4, Page 126)**	**Note : BESMM4, page 126** **M22** interpretes **Destination** as: *general area to make up levels, backfillng foundations, Landscaping areas' planter beds and the likes. **D9** Defines **Source** as: *direct from excavations on site or from temp. spoil heaps. **Observation/Correction**: Final thickness of fillg stated where excdg. 500mm **(m3)**, i.e. (1.5:11.2.1*2).
C	m2		**Damp proof membrane** **(1.5:16.2.1)** Damp proof membrane; over 500mm wide, 1mm gauge. **(BESMM4, Page 128)**	

			1.11: IN SITU CONCRETE WORKS	**BESMM4** identified the descriptive features commonly encountered in this category of work as (P**age 146**): -In situ concrete -Surface finishes to insitu concrete -Formwork -Reinforcement -Designed joints in situ concrete -Accessories cast into insitu concrete -In situ concrete sundries. **Note:** BESMM4 classified in-situ concrete works into **(Page 148)**: -Mass concrete (Definition Rule **D1**) -Horizontal work (Coverage Rule **C7**) -Sloping work <15° (Coverage Rule C**8**) -Sloping work =15° -Vertical work (Coverage Rule **C10**) -Sundry in-situ concrete work (Coverage Rule **C11**) -sprayed insitu concrete. **Observation/Correction:** - the symbol ≤ and/or ≥ was written as = .(pages 148,149, 150 etc).
			In-situ Concrete Works **(1.11:1.1.2/1)**	
	m3		Mas conc. Grade 30; 225mm thick; in trenches; poured on or against earth or unblinded hardcore. **(BESMM4, Page 147)**	
			(1.11:2.1.1/1)	
	m3		Horizontal work; weak conc 1-10 graded aggregate less or equal 300mm thick, in blinding; poured on or against earth or unblinded hardcore. **(BESMM4, Page 148)**	
			(1.11:2.2.2/2)	
	m3		Horizontal work, grade 25 conc; over 300mm thick; in structures; Reinforced ≤ 5%. **(BESMM4, Page 148)**	
			(1.11:5.1.1/1)	
	m3		Vertical work, grade 25 conc; ≤ 300mm thick; in structures; Reinforced ≤ 5%. **(BESMM4, Page 149)**	

			Formwork for in situ conc.	-
			(1.11:13.1.0)	
	m		Plain formwork to sides of foundations and	
	-		bases; ≤ 500mm high; 400mm wide.	
	-		**(BESMM4, Page 151)**	
				Note:
			(1.11:13.2.0)	- Definition Rule **D2** required that permanent formwork or
	m2		Plain formwork to sides of foundations and	fmwk left - in shall be so described (BESMM4, Page 151).
			bases; over 500mm high.	- Definition Rule **D4** defined irregular shape as any shape
			(BESMM4, Page 151)	other than square or rectangular. (BESMM4, Page 152)
				-
			(1.11:14.1.0)	-If the width is >500mm, then the items are measured as
	m		Plain fmwk to edges of horizontal; ≤ 500mm	superfiscial item. (BESMM4, Page 151).
			high; 150mm.	
			(BESMM4, Page 151)	
			(1.11:15.1.1)	
	m2		Plain fmwk to soffits of horizontal work; for	**Observations :**
			conc. ≤ 300mm thick; Propping ≤ 3.0m high.	- the symbol ≤ and ≥ was written as = (pages 151,152, etc)
			(BESMM4, Page 151)	- horizontal concrete work clssified as ≤ 300mm and
				> 300mm thick (pages 148,149 &150) while fmwk to soffits
			(1.11:20.1.0)	of horizontal conc. work classified as ≤ 300mm,
	m2		Plain fmwk to sides of isolated cols. 65Nr;	300 - 450mm, and > 450mm thick (page 151).
			Regular, rectangular shape.	
			(BESMM4, Page 152)	
			(1.11:22.1.0)	-
	m2		Plain to faces of walls and other vertical ;	
			vertical.	
			(BESMM4, Page 152)	

	Ton. m2		**Reinforcement.** **(1.11:34.1.2/1)** High yield steel bar to BS 4449; 16mm diameter; bent; bars exceeding 12m long; 18.21m long. **(BESMM4, Page 155)** **(1.11:37.1*2*3.0)** Mesh; 4.52kg/sq.m Ref. A152 minimum laps 150mm. **(BESMM4, Page 156)**	**Note:** -BESMM4 allows the use of local content, makes it easy to specify local quality standard but where none is obtainable the British Standard may be used.

	m2 m		**1.14 : MANSORY** **Brick/Block walling** **(1.14:1.2.1/1)** Walls; 230mm overall thicknes; blockwork; skins of hollow walls; laid in stretcher bond with cement mortar (1:3). **(BESMM4, Page 165)** **(1.14:16.3.3)** Damp proof course ≤ 300mm wide; 50mm thick cem. & sand (1:1); Horizontal. **(BESMM4, Page 170)**	**BESMM4** identified the descriptive features commonly encountered in this category of work as (P**age 164**): -Brick/Block walling -Glass Block walling -Natural Stone rubble walling and dressing -Natural Stone As War walling and dressing -Artificial/cast stone walling and dressing.

			1.15: STRUCTURAL METAL WORK	
			Structural steel framing of welded constructn. to BS EN……Grade 275, hot rolled, welded fabrication	**Note:** -Weight classification are now ≤ 25kg, 25-50kg, 50-100kg or over 100kg, and so on in increment of 50kg/m (40kg, 40-100kg in BESMM3). -Permanent formwork changed to Profile decking (page 176).
A	<u>Ton</u>		**(1.15:1.2.3/1)** Framed members, framing and fabrication; lengths over 1.00 but not exceeding 9.00m; weight 50-100 kg/m; columns size 203x203x86 kg/m. ___x 86kg/m/1000 (tonnes). **(BESMM4, Page 173)**	
B	<u>Ton</u>		**(1.15:2.0.0/1)** Framed members, permanent erection on site; Crane. ____x Weight/m/1000(tonnes). **(BESMM4, Page 174)**	
C			**(1.15:5.2.1.0)** Allowance for fittings; percentage allowance 15%; to framed members. **(BESMM4, Page 175)**	
D	<u>Nr</u>		**(1.15:10.1.1)** Holding down assemblies; 10mm thick base plate holding 4Nr. 20mm diameter threaded bolt 400mm long complete with nuts and washers welded to stanchions. **(BESMM4, Page 177)**	

			1.16: CARPENTRY **Hardwood impregnated with Solignum or or equal and approved preservatives.**	**Note: Supplementary information, page 180.** **S1:** Kind quality and size of materials **S2:** Type of preservative treatment. **S3:** Type of protective coating **S4:** Method of fixing where not at the discretion of the contractor.
A	m		**(1.16:1.1.3/1*5*6)** Primary structural timbers; 100 x 150mm; Wall Plates; fixed or tied to wall or conc. with metal fastener. **(BESMM4, Page 181)**	
B	m		**(1.16:1.1.3/1*5*6*9)** Ditto; Length over 6.00m in one continuous length **(BESMM4, Page 181- 182)**	
C	m		**(1.16:1.1.3/1*5*6)** Primary structural timbers; 50 x 150mm; Rafter and associated timbers; nailed to wood. **(BESMM4, Page 181)**	

			1.17: SHEET ROOF COVERING	
			0.55mm gauge oven baked corrugated Longspan Alluminium roofing sheet.	**Note:** **Page 184 - 187 of BESMM4** **-Measurement Rule M1:** The areas and lengths measured are net in contact with base.
A			**(1.17:1.2.3/1)**	**-Measurement Rule M2 :** No definition is made for voids ≤ 1.00m2.
	m2		Roof covering greater over 500mm wide; sloping, 30° pitch; oven baked coloured; fixed to hardwood purlins (purlins measure separately). **(BESMM4, Page 185)**	**-Definition Rule D1:** Identified sheet lead, aluminium, corper, zinc, stainless steel, fibre e.t.c as roof covering measured under sheet roof covering. **-Definition Rule D3:** Defined Boundary work as work associated with closing off or finishing off sheet roofing at the *external perimeter,* at the *abutment with differen*t *materials* or the *perimeter of openings and voids*
B			**(1.17:5.1.5.1)**	
	m		Flashing; 450mm girth; Ridges; Horizontal. **(BESMM4, Page 187)**	**-Coverage Rule C7**: Flashings are deemed to include bedding, ends, angles, rough and fair cutting, intersections, beaded or shaped edges etc.
C			**(1.17:4.1.2/1)**	**-Coverage Rule C1**: works and mat'ls deemed included: a) Underlay in contact with the covering b) All rough and fair cutting and waste c) Extra mat'ls required for bonding d) Extra mat'ls in laps and dressings etc.
	m		Boundary work, L-shsaped at external perimeter; 50mm girth; Eaves; Horizontal. **(BESMM4, Page 186)**	

			1.38 : MECHANICAL SERVICES **Supply and Install the following sanitary fittings manufactured by 'Sweethome' or equal and approved.**	
A	Nr		**(1.38:1.1.1/1)** Primary Equipment; 30 liter Water Heater with authomatic power off switch; hanged above door level on block or conc. wall. **(BESMM4, Page 285)**	
B	Nr		**(1.38:1.1.1/1)** Ditto; 15 liter Water Heater with authomatic power off switch; hanged above door level on block or conc. wall.	
C	Nr		**(1.38:2.1.1/1)** Terminal equipment and fittings; Water Closet Suite comprising Tank with flushing mechanism; Bowl plugged and screwed to to floor with matching screws including seat, cover and pan connector. **(BESMM4, Page 286)**	
D	Nr		**(1.38:2.1.1/1)** Toilet roll holder; plugged and screw to block wall.	

			1.38 : MECHANICAL SERVICES CONT'D **Cold Water Supply System** **Tigre or other equal and approved PVC pressure pipes.**	
A	m		**(1.38:3.1.1/1)** Pipework; Straight; 25mm diam.; jointed to manufacturers fixing instructions; fixed in conc. or blockwork chases **(BESMM4, Page 287)**	
B	Nr		**(1.38:4.4.2)** Pipe fittings; Bends; 25mm diam. Pipe; jointed to manufacturer's instructions. **(BESMM4, Page 287)**	
C	Nr		**(1.38:4.11.2)** Pipe fittings; Sockets; 25mm diam. Pipe; jointed to manufacturer's instructions. **(BESMM4, Page 287)**	

3.0 Practical Demonstration of the use of BESMM4 for Billing of Building Works

	SUBSTRUCTURE				
	1.5: EXCAVATING AND FILLING				
1.5:1.1.1/2	Preliminary site work; underground Service, max depth 900mm, upvc water supply pipe, location left to the discretion of the contractor.		Item		
1.5:1.2.1/2	Preliminary site work; Trial pits to locate existing services, max depth 1.2mmm, at the discretion of the contractor.		Nr.		
1.5:1.3.1/2	Preliminary site work; Borehole to determine ground condition, 150mm diameter, 36.00m max depth, core samples to Fedpoly soil test laboratory for geotechnical report.		Nr		
1.5:2.1.1	Removing Trees; Grubbing up roots and disposal; girth 500 - 1500mm; Filled void with material arising from excavation.		Nr.		
1.5:3.31	Ditto; Girth 3.00m - 4.5m; -do-		Nr.		
1.5:4.1.1	Site Clearance; Clearing Site vegetation and other growth and dispose off site; including tree stumps less than 500mm girth, hedges and shrubs, filling void with materials arising from excavation.		Sq.m		
1.5.5.2	Site Preparation; Remove topsoil 150mm deep		Sq.m		
1.5:6.1.2	Excavation, commencing from stripped level; Bulk excavation to form basement; over 2m but not exceeding 4m deep.		Cu.m		
1.5:6.2.1	Excavation, commencing from stripped level; Foundation excavation; not exceeding 2m, strip excavation.		Cu.m		
1.5:9.1.1	Disposal; Ground Water; 600mm below original ground level		Item		
1.5:9.2.0	Excavated material off site		Cu.m		
1.5:10.1.1	Retained excavated topsoil on site, to temperature spoil heaps average distance 10m.		Cu.m		
1.5:11..1.1	Final thickness of filling not exceeding 500mm, 450mmmm thick; site, not exceeding 1.0maround site, back filling foundation; in layers of 150mm		Sq.m		
	To Collection				

General Summary of Bill of Quantities

	MAIN SUMMARY				
1.0.0	• Measured work (Incorporating Contractor designed works)				
1.1.0	* Facilitating works			xxx .xx	
1.2.0	* Substructure			xxx .xx	
1.3.0	* Superstructure			xxx .xx	
1.4.0	* Internal finishes			xxx .xx	
1.5.0	* Fittings, furnishings and equipment			xxx .xx	
1.6.0	* Services			xxx .xx	
1.7.0	* Prefabricated buildings and building units			xxx .xx	
1.8.0	* Work to existing buildings			xxx .xx	
1.9.0	* External works			xxx .xx	
	Total Measured work				xxxxx.xx
2.0.0	• Preliminaries (main contractor's preliminaries)				xxxxx.xx
	Sub-total				xxxxx.xx
3.0.0	• Provisional Sums				
3.1.0	*Defined			xxx .xx	
3.2.0	*Undefined			xxx .xx	
3.3.0	* Works to be carried out by statutory undertakes			xxx .xx	xxxxx .xx
	Sub-total			-	xxxxx .xx
4.0.0	• Risks			-	xxxxx .xx
	Sub-total			-	xxxxx .xx
5.0.0	• Main contractor's overheads and profit (insert % adjustment)			xxx .xx	xxx .xx
	Sub-total				xxxxx .xx
6.0.0	• Credits (for materials arising from the works)				xxx .xx
	Sub-total				xxxxx .xx
7.0.0	• Main contractor's fixed price adjustment				xxx .xx
	Sub-total				xxxxx .xx
8.0.0	• Directors adjustment ((insert required adjustment (+/-)				xxx .xx
	Sub-total				xxxxx .xx
9.0.0	• Dayworks (provisional)				xxx .xx
	TOTAL TENDER PRICE exclusive of VAT(Carried to form of Tender				xxxxxxx . xx

4.0 Conclusion

The new edition of Building and Engineering standard method for measurement of construction work (BESMM4) which serves as an upgrade of BESMM3 was drafted to accommodate the increasing technological advancement. It is easily understood and permits the use of local standardized materials as well as meeting the global best practices.

The introduction of Risk Management (which in the past years have been a major contributor to cost-overrun of construction projects) and redefining of provisional and pc sums is a positive transformation from the traditional contrast documentation towards modern global practice.

The document reasonably remove some items of work which in most cases are not carried out on site, such as, earthwork support and working space during excavation, to some extent reduce construction cost. While appreciating the effort of NEC and the ad-hoc committee in compiling the BESMM4, there is the need for the correction of some inconsistencies, cross referencing and typographical errors.

I sincerely appreciate NIQS Ondo State chapter for the opportunity to present this paper.

Thank you.

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