



**SEGi UNIVERSITY**

# INTRODUCTION OF MEASUREMENT OF BUILDING WORKS

Last Updated.\*

## Method of Measurement Week 2

PowerPoint® Slides  
by Aminah M. Bakhari

# Outline Topic

## Introduction

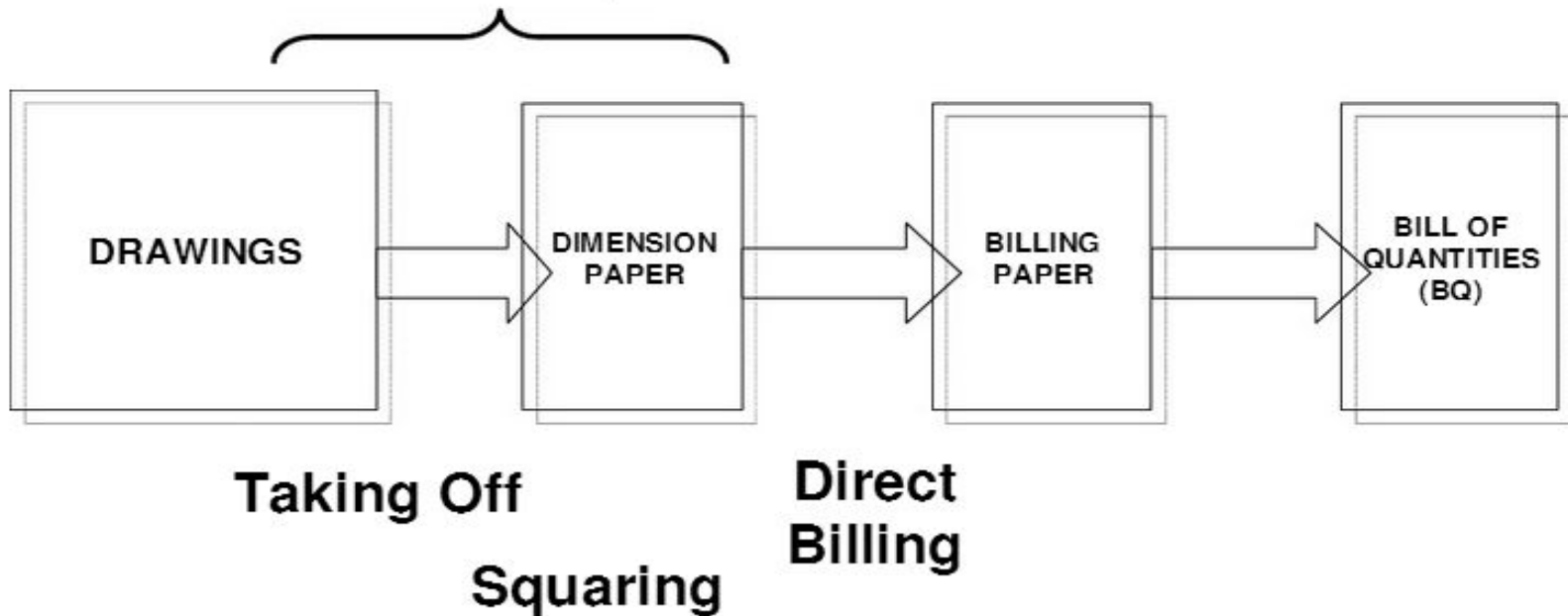
- ❖ Principles of measurement/ taking off
- ❖ Uses and methods of measurement

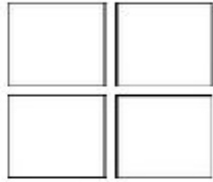
# Learning Objectives

Explain clearly about measurement principles and methods used by using the Malaysian Standard Method(s) of Measurement and codes for building works.

# BQ Preparation - Development

## Measurement of quantities





# BQ Preparation

## 4 Stages Of BQ Preparation (Traditional)

### Taking Off / Squaring / Abstracting / Billing

#### **Taking Off**

Taking off is a process of transferring the dimension scaled or read from the drawings to a specially ruled paper called the dimension paper.

#### **Squaring**

Squaring is a process of getting the total quantity whether in number, length, area or volume for each set of measurement in the dimension paper.

#### **Abstracting**

Abstracting is a process of transferring the squared dimensions to the abstract where they are written in a recognised order under the appropriate work section headings and subsequently totaled and converted to the required units or billing as stated in the Standard Method of Measurement.

#### **Billing**

Billing is a process of re-writing all the items including their

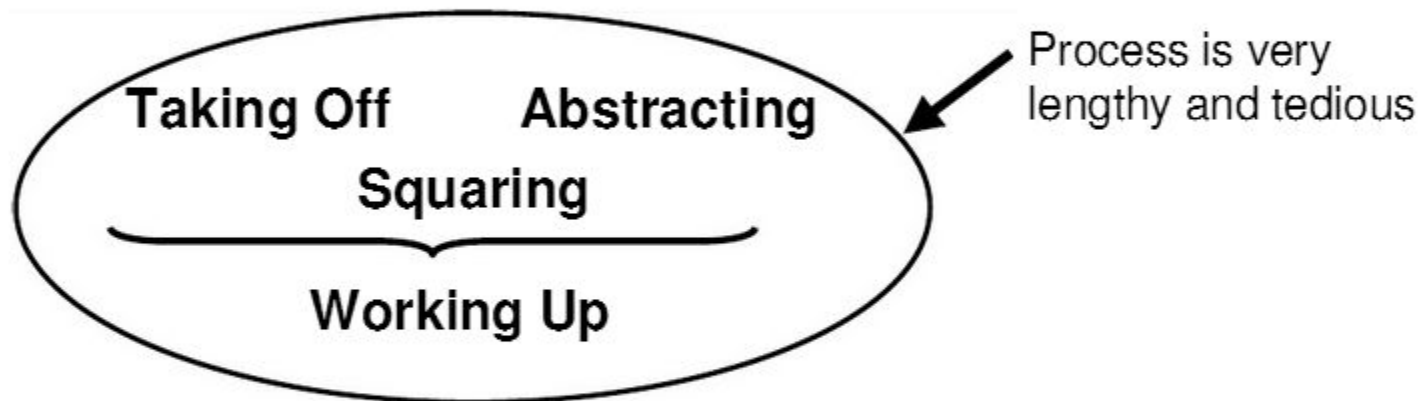
### **Abstracting**

Abstracting is a process of transferring the squared dimensions to the abstract where they are written in a recognised order under the appropriate work section headings and subsequently totaled and converted to the required units or billing as stated in the Standard Method of Measurement.

### **Billing**

Billing is a process of re-writing all the items including their quantities taken from the abstract for the whole project, into the billing papers in a recognised format of a Bill of Quantities.

## BQ Preparation - Development



Various ways of simplifying the process have been developed

“Bill direct” i.e. by transferring the items directly from the dimension sheet to the bill, eliminating the need for an abstract.

Further methods: “cut and shuffle” and computers systems were developed.





# Principles of Measurement

# Measurement

- ❖ Any construction work measurement is getting an important place.
- ❖ To get correct and accurate measurement for this we use SMM2 ( Standard method of measurement) provides basis for measuring building works and embodies the essentials of good practice.
- ❖ In general defined as a process or the result of determining the scale of a *quantity*, such as length or mass, relative to a unit of measurement, such as a meter or



# Principle of Measurement

Timesing  
column

Dimension  
Column

## Traditional

### Dimension Paper

The dimensions are measured from the drawings by the taker off, using paper ruled as follows:

1	2	3	4	1	2	3	4
Squaring Column			Description Column				

# Principle of Measurement

Column 1 – Timesing Column

Multiplying figures are entered when there is more than one

Column 2 – Dimension Column

Actual dimensions as scaled or taken direct from the drawings, are entered.

There may be one, two or three lines of dimensions in an item depending on whether it is linear, square or cubic.

# Principle of Measurement

## Column 3 – Squaring Column

Length, area or volume obtained by multiplying together the figures in column 1 and 2 is recorded, ready for transfer to the abstract or bill.

## Column 4 – Description Column

Written description of each item is entered.

The right hand side of this wider column is frequently used to accommodate preliminary calculations.

# Basic Component of Measurement:

## QUANTITY

The arithmetical result of booked dimension.

In getting the result/quantity, the mathematical/mensuration techniques need to be applied.

## Basic Component of Measurement:

**Description** - The written explanation of what is being measured. Usually it describes the size/dimension of the measured items, the material.

**Abbreviations** – many of the words entered in the description column are abbreviated in order to save space and time spent in entering the items by highly skilled technical staff. Abbreviations are standard and general application.

**DITTO** – used to repeat the measured item description which is written above or before.

# Basic Component of Measurement:

## UNIT OF MEASUREMENT

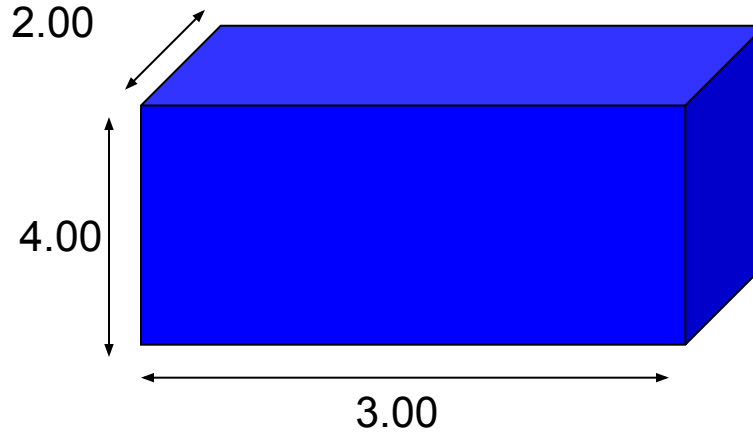
The unit may be one of the following:

- i. Cubic Measurements
- ii. Square or superficial Measurements
- iii. Linear Measurements
- iv. Enumerated Items
- v. Items



# Unit of Measurement

## Cubic Measurements



	3.00			Indicating a cubic measurement 3.00m long, 2.00m wide and 4.00m deep (m <sup>3</sup> )
	2.00			
	<u>4.00</u>			

# Unit of Measurement

## Square or superficial Measurements

	3.00 <u>2.00</u>			Indicating a cubic measurement 3.00m long and 2.00m wide
--	---------------------	--	--	---

# Unit of Measurement

## Enumerated

	<p style="text-align: center;"><u>4</u></p> <p style="text-align: center;"><u>Nr 4</u></p>			<p>Indicating four in number (no)</p>
<p style="text-align: center;">4</p>	<p style="text-align: center;">1</p>			

# Unit of Measurement

Item

	<u>Item</u>			Indicating items no quantities
--	-------------	--	--	--------------------------------

# Unit of Measurement

Set down the dimensions in the following order:

1. Horizontal order
2. Horizontal width and breadth
3. Vertical depth or height

# Unit of Measurement

Taker off has written the dimension then having more items to indicate the measurement multiplied as follow:

<del>5</del>	3.00  <u>2.00</u>			Indicating items no quantities having been multiplied by 5, the result is to be multiplied by 5.
--------------	-------------------------	--	--	--

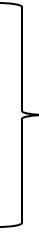
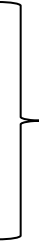
## **Basic Component for Measurement:**

# **STANDARD METHOD OF MEASUREMENT 2 FOR BUILDING WORK (SMM2)**

Provide a uniform basis for or set of rules for the measurement and description of building works.

# PROCESS OF MEASUREMENT

## ORDER OF TAKING OFF

SECTION OF WORK	BROAD CLASSIFICATIONS
1. Work Below Lowest Floor Finish; 2. Frame 3. Floors (solid and suspended); 4. Brickwork; 5. Roofs; 6. Finishings (walls, ceiling and floors); 7. Doors and Windows; 8. Fittings; 9. Stairs; 10. Plumbing Installation 11. Other Services	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">}</div> <div style="text-align: center;">Carcass</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">}</div> <div style="text-align: center;">Finishings</div> </div>



# PROCESS OF MEASUREMENT

## Taking - Off List

The lists of all the measured items complete with the measuring units.

Taking-Off List		Unit
1.	Excavation top soil	m <sup>2</sup>
2.	Excavation to reduce level	m <sup>3</sup>
3.	Remove excavation material	m <sup>3</sup>
4.	Excavation pit for pad foundation	m <sup>3</sup>
5.	Filling to excavation	m <sup>3</sup>
6.	Excavation for ground beam	m <sup>3</sup>
7.	Excavation in rock	m <sup>3</sup>

# PROCESS OF MEASUREMENT

## QUERY SHEET

When taking-off in practice the quantity surveyer will enter any queries for the architect on query sheets.

Example:

<b>Question</b>	<b>Answer</b>
1. What size of Door 1	900 x 2100 (confirmed by Architect)
2. What diameter reinforcement link in column stump?	6mm diameter (confirmed by Engineer)

# PROCESS OF MEASUREMENT

## SLIP SORT

To set down all the taking-off and dimensions into the relevant column provided in the sort.

# PROCESS OF MEASUREMENT

## BILLING PAPER

To set down all quantity and quality of all the components parts necessary for the construction of works .

Example:

Item	Description	Unit	Qty	Rate	Amount (RM)

# Learning Outcomes

- On completion of this topic, students shall be able to apply their knowledge and understanding about principles of measurement with the standard method(s) of measurement and codes for building works.