

# HOW TO SET UP EXCEL SPREADSHEETS TO MEASURE, TRANSFER AND BILL BILLS OF QUANTITIES IN A REAL TIME MANNER

by

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## What if you don't have

BIM (Building Information Modelling), or  
proprietary software, or  
in-house software

capable of

measuring accurate quantities, and  
suiting your local method of measurement, and  
your financial capability?

## Traditionally

paper based  
dimension sheets and schedules to measure

## Now

Excel to measure and bill

## Excel good

schedules for measuring inter-related items  
instant calculation  
save a lot of calculation time

## Care required

proper format  
good looking and meaningful  
correct formulae  
correct transfer of totals  
integrity of the cross-references in the formulae

## Template

uniform format over and over  
a few simple formulae  
simple set-up  
simple formula checking  
entirely user-defined coding  
instant updating of final quantities  
measurement by composite items first

## Applications

bills of quantities  
cost estimates  
bills of variations  
remeasurement bills  
etc.

where extensive measurement and billing are required

## Excel functions used

**PRODUCT**(range\_of\_cells)

**SUM**(range\_of\_cells)

**SUMPRODUCT**(range\_A\_of\_cells, range\_B\_of\_cells)

## Excel functions used

**VLOOKUP**(search\_value, lookup\_table, return\_column,  
FALSE)

**IF**(criteria, A, B)

**COUNTIF**(range\_to\_search, search\_value)



## Excel functions used

**{=SUM(IF(criteria, range\_A, range\_B))}**

*curly brackets {} by pressing key F2 to edit the formula  
cell, then press Ctrl+Shift+Return*

**SUMIF(range\_to\_search, criteria, range\_to\_sum)**

*no curly brackets but can handle only one criterion*

## Excel functions used

**ROUND**(number, number\_of\_digits)

“\$” for anchoring column or row reference

## Worksheets

One “Primary” Worksheet for generating Primary  
Quantities

One “Secondary” Worksheet for generating Secondary  
Quantities using the Primary Quantities

More than one “Bill Page” Worksheet using the  
Secondary Quantities

## Work Flow

Use Primary Worksheet →  
measure work items →  
get Primary Qty →  
assign Primary Codes →

Switch to Secondary Worksheet →  
enter Primary Codes →  
obtain totals of Primary Qty →  
process further to generate Secondary Qty →  
assign Secondary Codes

## Work Flow

Switch to Bill Page Worksheet →  
enter Secondary Codes →  
obtain totals of Secondary Qty →  
assign BQ descriptions

### For experienced users

write up BQ Descriptions first →  
assign Secondary Codes →  
assign Primary Codes →  
measure following the normal flow

## Composite measurement

Primary Quantities	Further processing (where "*" = multiplied by)
Column height	* cross section = column concrete; * column girth = column formwork
Beam length	* cross section below slab = beam concrete; * beam soffit = soffit formwork; * beam side * 2 = side formwork
Window number	* window width * window height = total window area; * window width = total window cill length; * (window width + window height * 2) * reveal width = total wall reveal area

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Primary Quantities	Further processing (where "*" = multiplied by)
Door number	* door leaf width * door leaf height = total door leaf area; * frame or architrave girth per door = total door frame or architrave girth; * ironmongery number per door = total ironmongery number
Room internal area	= ceiling plan area = floor area
Room internal girth	* ceiling height = wall area; = skirting length

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Primary Quantities	Further processing (where "*" = multiplied by)
Plaster and paint composite area	= Plaster area = Paint area
Tile and screed composite area	= Tile area = Screed area
Roof area	= Roof tile area = Roof screed area = Waterpoofer area = Insulation area = Levelling screed area



## User-defined Codes

systematic  
structured  
readily understandable

e.g.

RC30-CL, RC30-BM, RC30-WL  
FWK-CL, FWK-BM, FWK-WL

## Cautions

**Cut and paste:** would corrupt integrity of formulae

**Use “copy and paste”:** to replicate the contents and then delete the original contents

**Insertion and deletion:** borrow format and formulae from existing rows or columns

## Cautions

**Upper and lower boundary rows:** common error to insert a row before or after the rows to be summed up – to prevent this, use pair of specially narrowed rows as the upper and lower boundaries of the formulae

**Seed rows:** do not disturb seed rows for replication of format and formulae to other rows, use them to ‘refresh’ all formulae of the same kind

## Cautions

**VLOOKUP**: watch out whether the formulae using this function is disturbed by reason of insertion or deletion of columns

**Assigning sequence number**: to record the original or logical sequence of the dimension rows

**Advanced filtering and sorting**: to obtain a unique and sorted list

**Insufficient row height**: in case of long BQ Description

## Counter-checks

**Integrity of Units:** units to be consistent with the number of dimensions used

**Sum totals:** sum totals of the relevant table columns are given for cross-checking

**Replication of the columns by “copy and paste”:** to maintain the same formula pattern

## Counter-checks

**Times of Row Qty used:** to ensure that measured quantities are actually used and not left out

**Revealing the formulae:** to see all the cell formulae and print them out

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# Floor Analysis

## Miscellaneous

Drafting descriptions and coding first

Frozen view panes

Print page headers

Print page footers

Word-wrapping



## Miscellaneous

Alignment

BQ item references

Smaller font size of Bill-Column C (Code)

Indentation of headings at the third or lower level of BQ  
Descriptions

## Miscellaneous

Use of Sum() to deal with non-numeric entries like “Rate only”, “Included”, etc.

Anchoring by “\$” as appropriate

Before distribution: converting formulae to values; hiding or deleting the unnecessary

## Epilogue

Excel easy, powerful and flexible

but needs cautions and a lot of safety belts

dangerous to set-up ad-hoc worksheets

worksheet with a uniform format, proven formulae and  
safety belts more desirable

- End -