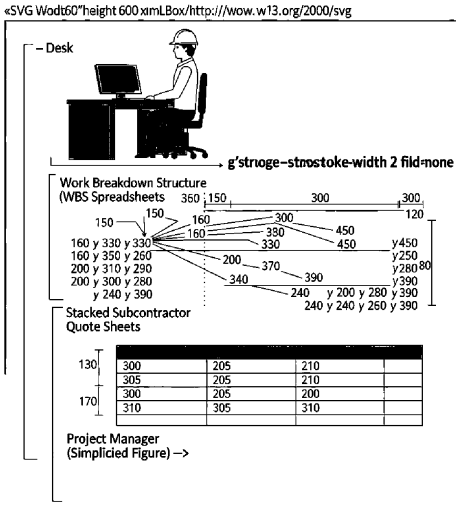
HIGH-VOLUME

WORKSHEET 1 OF 9

WBS Quick-Build Sheet -- Two-Level Structure

Fill in before any bid is submitted for a project exceeding 15% of annual capacity. Fifteen minutes. One page per project.



Complementary worksheet for
Project Cost Estimation
by Ibrahim Anwar

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SECTION 1

What This Is For

This worksheet forces the operator to name every work package before pricing any of them. The discipline of building a two-level Work Breakdown Structure -- phases at the top, packages underneath -- is the only reliable mechanism that catches missing components before the bid is sent rather than after the invoice arrives. Missing components are the most common cause of cost overruns among small contractors: not wrong wage figures, but work that was simply never listed.

Use this sheet on any project whose value exceeds 15% of your annual capacity, or any project involving work types you have not done in the past twelve months. The exercise takes fifteen minutes on paper. The 100% rule check at the end -- every contract item has a WBS row, every WBS row has a contract item -- takes five more. What those twenty minutes protect is the margin that disappears otherwise one uncounted commissioning day at a time.

SECTION 2

Benefits

What you get when you actually run this worksheet on a real situation:

- Catches missing cost components before the bid is sent, not after the invoice arrives and the money is gone.
- Produces a document that can be handed to an auditor or investor as the basis of the Budget at Completion figure -- no reconstruction needed.
- Becomes a post-project comparison sheet with one extra column added after completion, seeding the internal parametric database.
- Forces the 100% rule check: every contract deliverable gets a row, every row has a contract deliverable backing it.
- Separates materials, labour, and equipment per package so that each cost source can be verified independently, not lumped into a single line that hides where the estimate is weak.

SECTION 3

Framework To Use

Two-Level WBS Cost Build

Phase headers at Level 1; priced work packages at Level 2. Every row must trace to a contract deliverable.

1	{'label': 'Step 1', 'text': 'List Level 1 phases from scope document (Preparation, Main Works, Testing, Handover)'}
▼	
2	{'label': 'Step 2', 'text': 'Break each phase into Level 2 packages -- named activities that will actually happen on site'}
▼	
3	{'label': 'Step 3', 'text': 'Price each package: Materials / Labour / Equipment separately'}
▼	
4	{'label': 'Step 4', 'text': 'Apply 100% rule: every contract item has a row; every row has a contract item'}
▼	
5	{'label': 'Step 5', 'text': 'Sum to direct cost total. Add overhead rate, contingency category, profit markup. Result is BAC.'}

SECTION 4

How To Use

Follow these steps in order. Each one builds on the previous.

1. Pull the scope document, drawings, and contract before opening this sheet. The WBS is built from the contract, not from memory.

2. List every Level 1 phase down the left column. For construction projects: Preparation and Mobilisation, Main Works by area or system, Testing and Commissioning, Handover and Demobilisation. Adjust for your project type.

3. For each Level 1 phase, write the Level 2 work packages -- specific named activities. If an activity will actually happen on site but has no row here, it will happen at your expense.

4. Fill in Materials, Labour, and Equipment columns per package. Use actual vendor quotes for materials and actual subcontractor figures or day-rate calculations for labour. Do not leave any cell blank with the intention of filling it in later.

5. Apply the 100% rule: read the contract scope line by line. Every contract deliverable must have a corresponding row. Circle any deliverable without a row -- that is a missing component.

6. Sum the Subtotal column to get total direct cost. Apply your current overhead rate as a percentage of direct cost. Assign a contingency category (A, B, or C). Add profit markup. The resulting figure is BAC.

7. After the project finishes: add an Actual column beside each Subtotal. Fill it from invoices. The variance per package is the entry for your parametric database.

SECTION 5

Example Use

A mechanical contractor wins a bid for HVAC installation in a four-story office building. Contract value $87,500. The owner builds the WBS before pricing anything.

The owner lists five Level 1 phases: Preparation and Mobilisation, Ductwork Installation by Floor, Air Handling Unit Installation, Commissioning and Testing, Handover and Demobilisation.

Under Commissioning and Testing, she writes three Level 2 packages: full system airflow verification (all 180 diffuser points), pressure balancing and adjustment, and documentation preparation for the handover binder. This is the package that eight years of memory-based estimating had treated as "included in labour."

Airflow verification: two technicians, three days. At $85 per technician per day plus instrument hire of $40 per day: $550. Pressure balancing: one technician, two days at $85: $170. Documentation: half a day at $85: $43. Total commissioning package: $763.

On a $87,500 contract, $763 is less than 1%. But on a $500,000 contract, the same proportional miss is $4,300 -- and commissioning is not the only package that gets treated as "included."

After applying the 100% rule, she finds two more missing packages: daily site cleanup labour (contract requires clean site at end of each day) and certificate of compliance preparation (mandatory for the client's building permit finalisation). She adds both with line items. The completed WBS produces a direct cost total of $61,200. Overhead at 12% adds $7,344. Category A contingency at 6% adds $4,112. Profit markup at 15%: $10,899. BAC before markup: $72,656. Bid price: $83,554. The original memory-based figure had been $79,000.

SECTION 6

The Worksheet

Tear this out, copy it onto a fresh sheet, or fill it in directly.

WBS Quick-Build Sheet -- Two-Level Structure

Fill in before any bid is submitted for a project exceeding 15% of annual capacity. Fifteen minutes. One page per project.

LEVEL 1 PHASE	LEVEL 2 WORK PACKAGE	MATERIALS ($)	LABOUR ($)	EQUIPMENT ($)	SUBTOTAL ($)

SECTION 6 (CONTINUED)

Reflection Prompts

After filling in the worksheet on the previous page, work through these.

1. After filling in all rows: apply the 100% rule. Every activity that will actually happen on site -- including mobilisation, daily cleanup, handover document preparation, commissioning -- must have a corresponding row. Cross-check against the contract scope line by line. Any contract item without a WBS row is a missing component that will be paid from your margin.

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2. Sum the Subtotal column to get total direct cost. Apply your current overhead rate as a percentage. Assign contingency: Category A (5-8%) for low-risk recurring work, Category B (10-15%) for one or two unfamiliar elements, Category C (18-25%) for new project types or ambiguous scope. Add profit markup. The result is BAC before the bid price is set.

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3. After the project finishes: return to this sheet and fill in the actual cost per package from invoices. Every row with a variance above 10% is a data point for your parametric database and a question about which assumption was wrong.

SECTION 7

Tips and Traps

TIPS

- Build the WBS from the contract scope document, not from the previous project's WBS. The previous project's scope was different. Using it as a template means copying its structure, including any components it missed.
- Write Level 2 package names as actions, not categories. 'Install first-floor ductwork' is a package. 'Ductwork' is a category that hides how many packages are actually inside it.
- For mobilisation and demobilisation, write one row per physical movement: materials to site, equipment to site, temporary facilities, final cleanup, equipment return. A single mob/demob line obscures the actual cost.
- If a subcontractor is covering an entire Level 2 package, write the quoted or estimated contract value in the Equipment column and note 'subcontractor' in the package name. Do not leave the other columns blank.
- Time-box the WBS build to 30 minutes on the first pass. Then spend a second 15 minutes on the 100% rule check. Speed on the first pass; rigour on the second.

TRAPS

- Stopping the WBS at Level 1 and pricing by phase rather than by package. A phase-level estimate hides missing components inside the aggregated number. The mistake only appears after the work is done and the invoices arrive.
- Leaving the Equipment column blank because the subcontractor supplies their own equipment. If you are self-performing, equipment depreciation or rental must appear somewhere. A blank column is not zero cost.
- Running the 100% rule check from memory instead of from the contract document. Memory selectively recalls problematic parts of the project; it does not reliably recall all deliverables. Read the contract.
- Treating the WBS as a one-time pre-bid document. The same sheet returned to after project completion with an Actual column added is the most valuable post-project tool the business owns.

SECTION 8

Appendixes

Appendix A -- Minimum WBS Phases for Common Project Types

Mechanical / HVAC installation

1. Preparation and Mobilisation
2. Equipment procurement and receiving inspection
3. Installation by area or floor
4. Pipe and ductwork connections
5. Commissioning and Testing (do not merge with installation)
6. Documentation and Handover
7. Demobilisation and Site Cleanup

Electrical installation

1. Preparation and Mobilisation
2. Main distribution board installation
3. Cable pulling by zone
4. Termination and labelling
5. Testing and Energisation (do not merge with cable pulling)
6. Certificate of compliance preparation
7. Handover and Demobilisation

Light civil works (renovation / fit-out)

1. Preparation, hoarding, and demolition
2. Structural works
3. Finishing works by trade (tiles, plaster, paint -- separate packages)
4. MEP rough-in and fit-off
5. Inspection and snagging
6. Documentation and Handover
7. Cleanup and Demobilisation

Appendix B -- BAC Assembly Formula

```
Total direct cost (sum of all WBS subtotals)         = $_________
Overhead allocation (____% of direct cost)            = $_________
Subtotal before risk                                  = $_________
Contingency reserve (Cat A 5-8% / B 10-15% / C 18-25%
  applied to direct cost)                             = $_________
Budget at Completion (BAC)                            = $_________
Profit markup (____% of BAC)                          = $_________
BID PRICE                                             = $_________
```

Contingency is part of BAC, not part of markup.
Markup is profit. Contingency is a cost buffer for identified risk.
Conflating the two leaves the project with no contingency at all.

Appendix C -- 100% Rule Check Card

```
For each line in the contract scope document, ask:
  [ ] Is there a WBS row that corresponds to this deliverable?
  [ ] Does the WBS row have a non-zero cost in at least one column?
  [ ] Is the cost figure based on a quote, a unit rate, or historical
      data -- not a round number placed from memory?

Common scope items missing from UMKM contractor WBS sheets:
  [ ] Mobilisation (vehicle, equipment transport, temporary facilities)
  [ ] Daily site cleanup and waste disposal
  [ ] Safety fencing, signage, PPE per contract requirement
  [ ] Commissioning and testing (separate from installation)
  [ ] Handover document preparation (as-built drawings, O&M manuals)
  [ ] Certificate of completion or compliance preparation
  [ ] Demobilisation and final site condition restoration
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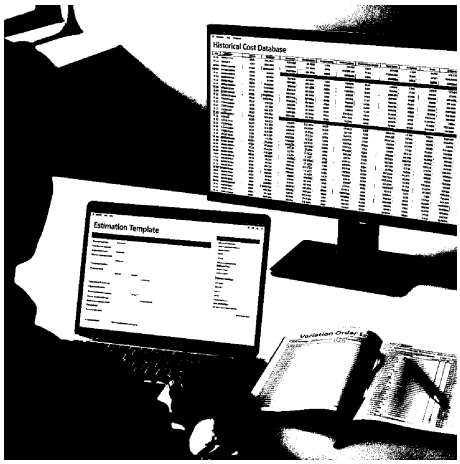

WHERE THIS WORKSHEET COMES FROM

Project Cost Estimation

Calculate the Cost Before Signing, Not After the Work Has Started

by Ibrahim Anwar

This worksheet is one of nine in the *Project Cost Estimation* companion worksheet pack. The full pack is grouped into three categories: high-volume worksheets you can run weekly, niche-search worksheets for rare but high-value situations, and specific-case worksheets that walk you through a single concrete scenario.

Every framework, decision filter, and figure used in these worksheets is drawn from the chapters of the source book. The book sets the diagnosis, the worksheets give you the form to act on it.

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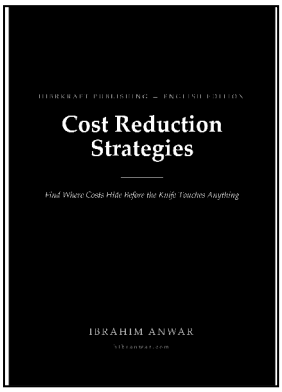

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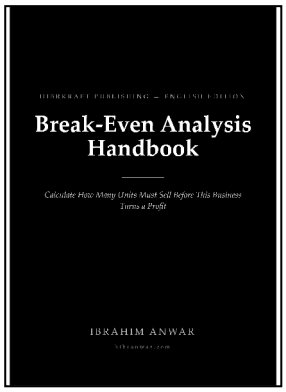

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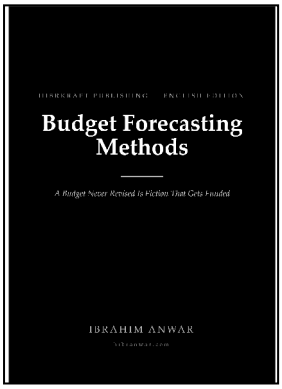

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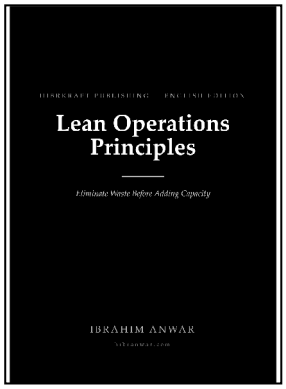

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