WHITE PAPER

What Does It Really Cost to Make? Multi-Level BOMs, Routing & Workstation Costing in ERPNext

Why a spreadsheet can't tell you your true product cost — and how ERPNext rolls up material, sub-assemblies, operations and scrap into one number you can price against.

For manufacturing & finance leaders · **9 min read**

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EXECUTIVE SUMMARY

Ask three people in a factory what a product costs to make and you'll often get three answers — because the number is scattered across purchase bills, a costing spreadsheet, and someone's memory of how long the line takes. ERPNext replaces that guesswork with a single, structural calculation: a Bill of Materials (BOM) that rolls up the cost of every raw material and sub-assembly, plus a Routing of operations that adds real conversion cost from each workstation's hourly rate, plus scrap. This paper explains how that roll-up actually works in ERPNext — using the real BOM, Routing and Workstation objects — and why it gives you a manufactured cost you can defend, price against, and trust for margin decisions.

Why spreadsheet product costing lies

The classic costing spreadsheet is a snapshot that goes stale the moment you save it. It hard-codes a material price from one purchase, a labour rate someone estimated, and an overhead percentage that was a guess to begin with. When steel moves, when a supplier revises a quote, when you add a machine — the sheet doesn't know. So the cost you quote against is quietly wrong, and you only find out when the margin isn't there.

The deeper problem is structural. A spreadsheet flattens a product that is actually built in layers — components inside sub-assemblies inside the finished good — into a single tab, so nobody can see where the cost really sits or trace it when it changes. And it almost never captures conversion cost honestly: the machine time, the operator time and the real per-hour cost of running each work centre. ERPNext fixes both problems by modelling the product the way the factory actually builds it.

How a multi-level BOM rolls up material cost

In ERPNext, a Bill of Materials lists the components needed to make one item — each row is a BOM Item with a quantity and a rate, and ERPNext totals them into the BOM's raw material cost. The power comes from the fact that a component can itself be a manufactured item. When a BOM row points to a sub-assembly, that row carries a link to the sub-assembly's own BOM, and ERPNext prices it from that BOM's total cost rather than from a number you typed. Turn on 'set rate of sub-assembly item based on BOM' and the cost of every sub-assembly flows up from its own definition — automatically, every level down.

This is the roll-up. ERPNext also maintains a fully exploded view of the BOM that flattens every sub-assembly back to its underlying raw materials, so you can see the true bottom-level material demand and cost behind the finished item. Change the price of a bolt three levels down, and the finished-good cost updates through every assembly that uses it — something no manual spreadsheet does reliably.

- Raw materials — each BOM Item's quantity × rate, summed into the BOM's raw material cost.
- Sub-assemblies — priced from their own BOM's total cost, not re-keyed; the roll-up recurses down every level.
- Exploded view — ERPNext flattens the whole tree to bottom-level materials so nothing is hidden inside an assembly.

- Scrap & by-products — secondary items and process loss are accounted for so the good units carry the real cost.

How routing and workstation rates add conversion cost

Materials are only half the story. The other half is what it costs to convert them — and this is where most spreadsheets give up. In ERPNext, a BOM with operations enabled carries a Routing: an ordered list of operations (cut, weld, assemble, paint, test), each assigned to a workstation and each with an operation time in minutes. A Routing is reusable, so the same sequence can be pulled into many BOMs without re-entering it.

Each workstation carries an hourly rate — and crucially, that rate is not a guess. It is built up from the workstation's own operating-cost components: the per-hour cost of things like electricity, rent, machine depreciation, consumables and labour that ERPNext sums into the workstation's net hour rate. The operating cost of an operation is then its run time against that hourly rate, and ERPNext totals every operation in the routing into the BOM's operating cost. That is real conversion cost, derived from how long the work takes and what each work centre genuinely costs to run per hour — not a flat overhead percentage bolted onto materials.

- Routing — a reusable, ordered list of operations, each on a workstation with a time in minutes.
- Workstation hour rate — assembled from real per-hour operating components (power, rent, depreciation, labour), not estimated.
- Operation cost — operation time × the workstation's hourly rate, summed across the routing into the BOM's operating cost.
- Fixed vs variable time — operations can hold setup time that doesn't scale with quantity, so per-unit cost is realistic at any batch size.

The full landed manufacturing cost

Put the two halves together and ERPNext computes one total cost for the manufactured item: raw material cost (including every sub-assembly, priced from its own BOM) plus operating cost (every operation × its workstation rate) plus the treatment of scrap and by-products. That total is written back to the BOM and becomes the basis for valuing the finished good — the same number that feeds inventory valuation, work-order costing and your margin on a sale.

Because the figure is assembled from live objects rather than typed in, it stays honest. There is a version for the transaction currency and one in your company's base currency, so multi-currency purchasing doesn't distort the domestic cost picture.

How ERPNext builds a manufactured item's cost

1. **Raw material cost**
   every stock component in the BOM, quantity × current rate, summed.

2 **Sub-assembly cost**
each sub-assembly priced from its own BOM and exploded down to raw materials, not re-keyed.

3 **Operating cost (routing × workstation)**
each operation's minutes × its workstation's real hourly rate, rolled up.

4 **Scrap & by-products**
secondary items and process loss accounted for so good units carry the true cost.

5 **= Manufactured item cost**
the roll-up ERPNext writes back to the BOM and uses to value the finished good.

Keeping BOM costs current

A cost is only as good as the prices behind it, so ERPNext lets you choose how BOM material rates are sourced. The 'rate of materials based on' setting on each BOM can pull the item's Valuation Rate (your live moving-average stock cost), the Last Purchase Rate, or a nominated buying Price List — so you cost against real, current numbers rather than a figure frozen months ago.

When prices move, you don't rebuild anything by hand. ERPNext can re-cost BOMs against the latest rates, and because sub-assemblies are priced from their own BOMs, a change at the bottom ripples up through every parent automatically. The result is a costing model that tracks reality — new supplier prices, new stock valuations, new workstation rates — instead of drifting away from it the way a spreadsheet does.

- Valuation Rate — cost materials at your live moving-average inventory value.
- Last Purchase Rate — use the most recent price you actually paid.
- Price List — cost against a maintained buying price list for planning or quoting.
- Ripple updates — re-costing flows changes up through every sub-assembly and parent BOM.

Using it for pricing and margin decisions

Once product cost is a trustworthy, traceable number, it becomes a decision-making tool rather than an accounting afterthought. You can set selling prices from a known cost floor instead of a hopeful markup, and you can see margin per product with confidence. Because the cost is broken into material, sub-assembly and operating components, you can also see where to attack it — is this product expensive because of a pricey input, an over-long operation, or a costly work centre?

That traceability turns costing into 'what-if' analysis. Swap a component for an alternative, move an operation to a faster workstation, or re-source a sub-assembly, and ERPNext shows the effect on total cost before you commit. For make-or-buy calls, you compare the rolled-up in-house manufactured cost against a supplier quote on the same, consistent basis.

Getting it right

The costing is only as good as the model beneath it, and that is where an experienced partner earns its keep. Getting real value out of ERPNext BOM costing means defining sub-assemblies at the right level, building routings that reflect how the line truly runs, and — most important — setting each workstation's hourly rate from genuine operating costs rather than a placeholder. Do that groundwork and the roll-up does the rest, giving you a live, defensible product cost.

For Indian manufacturers, this also lands cleanly alongside GST and inventory valuation: the same manufactured cost that ERPNext computes flows into stock valuation and financial reporting, so costing, operations and the books tell one consistent story. Acube Innovations, an official ERPNext partner, helps manufacturers set up BOMs, routings and workstation costing so the numbers are ones you can actually run the business on.

KEY TAKEAWAYS

1. ERPNext computes true product cost structurally — from a multi-level BOM plus a routing of operations — not from a static spreadsheet.
2. Sub-assemblies are priced from their own BOMs and exploded to bottom-level materials, so a price change anywhere ripples up automatically.
3. Conversion cost is real: operation time × a workstation hourly rate built from genuine per-hour operating components, not a flat overhead percentage.
4. Material rates can track your live valuation rate, last purchase rate or a price list — so costs stay current instead of going stale.
5. A trustworthy manufactured cost feeds pricing, margin analysis, make-or-buy decisions and GST-compliant inventory valuation from one source.

FAQ

How does ERPNext calculate the cost of a manufactured item?
It sums the BOM's raw material cost (every component and sub-assembly, priced from its own BOM) plus operating cost (each routing operation's time × its workstation hourly rate) plus the treatment of scrap and by-products, giving one total manufactured cost that ERPNext uses to value the finished good.

What is the difference between a BOM and a Routing in ERPNext?
A BOM lists what goes into a product — the materials and sub-assemblies and their quantities — and rolls up material cost. A Routing lists how it's made — the ordered operations, each on a workstation with a time in minutes — and drives operating cost. A BOM with operations enabled uses a routing to add that conversion cost.

Where does the workstation hourly rate come from?
It isn't a guess. Each workstation's net hour rate is built up from its own per-hour operating-cost components — things like electricity, rent, machine depreciation, consumables and labour — which ERPNext sums. Operation cost is then that hourly rate applied to how long each operation runs.

Does ERPNext BOM costing work with Indian GST and inventory valuation?
Yes. The manufactured cost ERPNext computes flows into stock valuation and the financial ledgers, and material rates can be sourced from your live valuation rate. So costing, GST-compliant inventory valuation and reporting stay consistent instead of living in separate spreadsheets.

Talk to a real ERPNext expert.

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