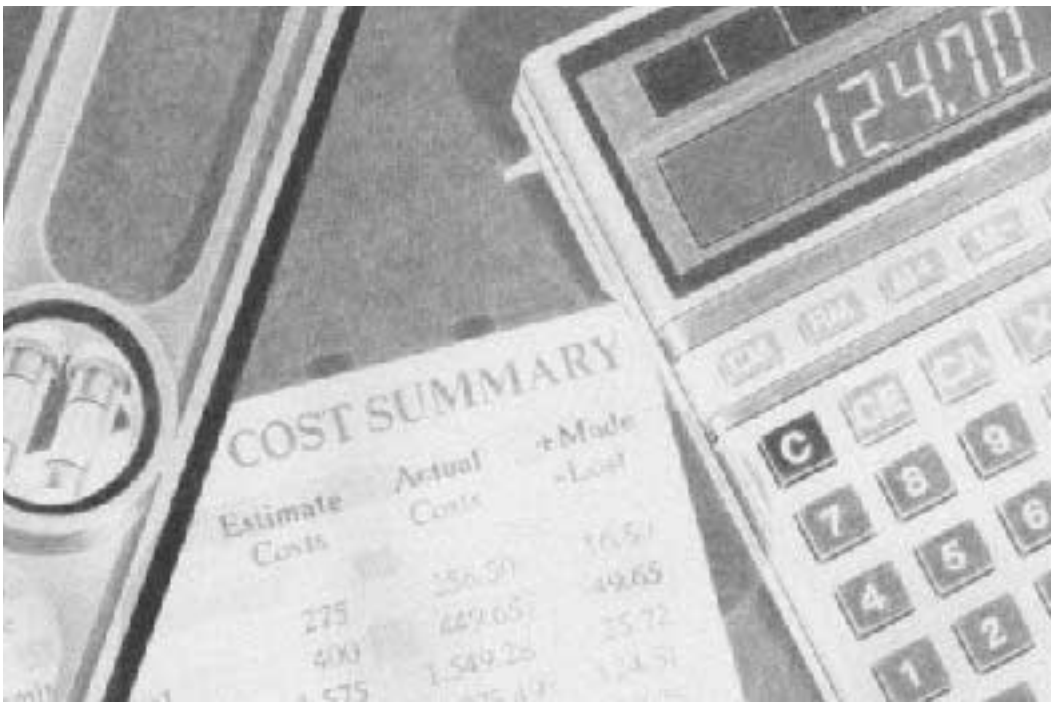
Job-Cost Accounting

by Paul Turpin



ROBERT HUNTOON

The kind of accounting that really matters in the construction business is cost accounting. If the job is not meeting the budget, then the business is losing money. Only by accurate recordkeeping and analysis can you find out where your estimates are off and how to correct them.

What Is Job Costing?

Construction projects all follow the same pattern. You make a cost estimate as the central part of your proposal to win the job and, once work begins, the estimate becomes a summary of budgeted costs. Job costing is the process of comparing budgeted costs to the actual costs you incur during construction to see if you are over or under budget.

The most important thing job costing does is help you to develop accurate data about your actual costs. These numbers are the lifeblood of an accurate unit-price estimating system. Let's say, for example, that your unit-price method for estimating labor and materials for framing 2x4 interior partitions is $12 per linear foot. If a job measures out at 200 linear feet, your base estimate is $2,400 ($12/l.f. x 200 l.f.). After you complete the work, you can find out how close this estimate is to your actual costs by reversing the arithmetic: Divide your actual cost by 200 linear feet to get your actual unit price per linear foot. If, for example, your actual total cost in this case was $2,656, you went over budget by $256. Instead of a unit-price of $12 per linear foot, the actual cost was $13.48 per linear foot ($2,656 ÷ 200 l.f.).

Another use for job costing, is to help with damage control for work still in progress. This amounts to short-term job costing, and requires you to estimate at a given point how much of the project you've finished and how much is still left to complete. Unfortunately, most residential builders don't have much opportunity for this kind of work-in-progress forecasting because our projects are too short. Even on a job that extends over several months, the individual phases — like framing or siding — are usually over and done with before our suppliers send the bill for the materials.

Break Down Your Costs

If you know how your estimated unit prices for various phases of the work are split between materials and labor, you can do a better job of analyzing your costs. Assume, for example, that the $12 per linear foot unit price for partitions is split 50/50, so that for 200 linear feet of partition you estimate $1,200 for

Tracking actual material and labor costs is the key to developing an accurate unit-price estimating system

Master List of Work Codes

1. Administration	
1.1 General Administration	Policies, procedures, marketing
1.2 Contract Administration	Contracts, C.O.'s, negotiations
1.3 Regulatory	Taxes, licenses, inspections
1.4 Financial	Bookkeeping, payroll, billing
1.5 Insurance	Workers' comp., liability
1.6 Maintenance	Equipment, facilities
2. Design	
2.1 Consultation	Meetings, site visits
2.2 Planning	Engineering, schedules, specifying
2.3 Drafting	Drawings, blueprints
3. Estimate	
3.1 Estimate Organization	Outline project
3.2 Plan Analysis	Verify plans
3.3 Subcontracts Organization	Sort work, solicit bids
3.4 Materials Take-Off	Calculate materials
3.5 Labor & Equip. Take-Off	Calculate labor, equipment
3.6 Projected Schedule	Outline, formulate timeline
3.7 Bid Information	Proposal, formal presentation
4. Job Set-Up & Support	
4.1 Access	House rules, hours, parking
4.2 Security	Locks, fencing, storage
4.3 Utilities	Power, water, gas, sewer, phone
4.4 Procurement	Materials ordering, deliveries
4.5 Work Areas & Equipment	Define, set-up, maintain
4.6 Storage Areas	Define, set-up, maintain
4.7 Clean-Up/Disposal	Define, set-up, maintain
4.8 Scaffolding, Cranes	Arrange for as needed
5. Site Preparation	
5.1 Clearing	Remove brush, trees, rocks
5.2 Rough Grading	Establish basic grade
5.3 Utilities Groundwork	All below-grade utilities
5.4 Drainage	Grade, below-grade devices
5.5 Excavation	Bulk excavation, trenching
5.6 Demolition	All demolition
6. Structural I	
6.1 Foundations	Concrete, waterproofing, insulating
6.2 Caissons	Drilled caissons only
6.3 Rebar	Reinforcing steel only
6.4 Masonry (Structural)	Block, waterproofing, insulating
6.5 Steel (Structural)	Structural columns, beams, bolts
7. Structural II	
7.1 Floor Assemblies	Sills, posts, girders, joists, subfloor
7.2 Wall Assemblies	Plates, studs, bracing, headers
7.3 Ceiling Assemblies	Joists, blocking, backing, furring
7.4 Roof Assemblies	Ridges, rafters, purlins, trusses
8. Rough Utilities	
8.1 Electrical	Panels, raceways, utility boxes
8.2 Prewire	Phone, intercom, alarm
8.3 Plumbing	Water/gas piping, DWV
8.4 Hvac	Furnace, vents, fireplaces, ducts
8.5 Specialties	Other in-wall elements
9. Envelope I: Exterior	
9.1 Roofing	Skylights, felts, roofing
9.2 Sheathing (Roofs, Walls)	Flashing, felt, housewrap, plywood
9.3 Siding	Wood siding, masonry veneer
9.4 Stucco	Lath, scratch, brown, finish
9.5 Doors & Windows	Doors, windows, hatches, vents
9.6 Eaves Treatments	Cornice, fascia, soffit
9.7 Entry Treatments	Stairs, railings, porches, steps
9.8 Ornamental Metalwork	Railings, fretwork, security bars
9.9 Exterior Millwork	Casings, stucco mold, brick mold
10. Envelope II: Interior	
10.1 Insulation	Walls, floors, ceilings, roofs
10.2 Interior Doors	Interior openings, closets
10.3 Drywall	Drywall, lath, mortar base
10.4 Plaster	Smooth, sprayed texture, plaster
10.5 Ceiling Finish	Acoustical tile
10.6 Floor Finish	Underlayment, carpet, sheet goods
10.7 Wood Flooring	Laying & finishing
10.8 Ceramic Tile/Stone	Floors, walls, counters
10.9 Finish Carpentry	Trim, stairs, railings, paneling
11. Interior Appointments	
11.1 Closets	Closet organizers, hardware
11.2 Cabinets	Kitchen, bath, utility
11.3 Countertops (Tile, see 10.8)	Counter, backsplash, nosing, trim
11.4 Lighting, Finish Electrical	Fixtures, devices, appliances, bulbs
11.5 Fixtures, Finish Plumbing	Fixtures, valves
11.6 Hvac Finish	Registers, controls, stove hoods
11.7 Kitchen Specialties	Appliances, specialty hardware
11.8 Bath Specialties	Med. cab./mirrors, towel bars, shower doors
11.9 Electrical Specialties	Alarms, security lighting
12. Site Improvements	
12.1 Finish Grading	Final grade, earthwork
12.2 Gutters & Finish Drainage	Final drainage
12.3 Landscape Planting	Plantings, specialties
12.4 Landscape Irrigation	Hose bibs, sprinkler systems
12.5 Landscape Lighting & Power	Lighting, gate openers
12.6 Concrete Paving	Driveways, walks, patios
12.7 Stone Paving	Driveways, walks, patios
12.8 Fences & Gates	Hardware & motors
12.9 Accessory Structures	Decks, garages, pools, (track separately)
13. Job Completion	
13.1 Decorating	Painting, staining, wallcoverings
13.2 Furnishing	Window treatment, furniture
13.3 Weathersealing	Gaskets, seals, caulking
13.4 Punchlists & Job Review	Touch-ups, repairs, replacements
13.5 Site Shut-Down	All equipment moved out
13.6 Final Clean-Up & Disposal	Last clean-up & disposal
13.7 Warranty Calls	Warranty repairs or replacements

Note: *The author's list of work codes roughly follows the chronological order of construction. The number code makes marking invoices easier. If a long list is cumbersome, start with a shorter list — for example, one that contains just the 13 main categories.*

materials and $1,200 for labor. If you faithfully mark all your invoices and time cards, you may discover that the $2,656 cost breaks down into $1,500 for materials and $1,156 for labor. Obviously, your crew did fine — they even beat their budget by a few bucks — but what happened to materials? It could be that the price you used for lumber was hopelessly out of date, or that you included the cost for three full boxes of different size nails, even though you barely used a handful of each and the rest went into inventory.

As a bare fact, going over budget doesn't tell you much by itself. You have to use your judgment to interpret the numbers. Did the job proceed as you imagined when you estimated it? If site conditions, scope of work, and other elements were within normal bounds, then your unit price was too low and you should raise it in the next estimate. Did you build more than you estimated? If you built an extra 20 linear feet of partition, then your budget should have been $2,640 ($12 x 220 l.f.), in which case your actual costs of $2,656 would be only $16 high. But this means you either missed a wall in your estimate or your change order system isn't working.

Keeping Accurate Records

Recordkeeping is a chore nobody likes, but job costing isn't possible without accurate information. The rule here is: Everything gets recorded. How much you are able to learn about your actual costs depends both on how detailed your estimate is and how detailed your records of actual costs are.

Work codes. The first thing you need is a list of work codes keyed to

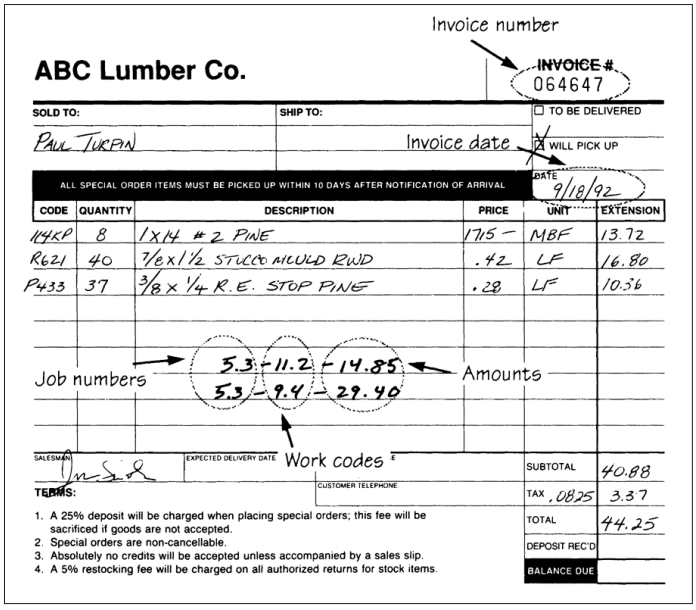


Figure 1. *The author marks every invoice with the job number, work code, and amount. On invoices that list material belonging in more than one work code, he breaks down the total amount into as many work codes as necessary.*

Employee Timecard

Period Ending: 3/24 JOHN SMITH

Date	Job#	Work Code	Hours	Notes
3/18	12	7.2	8	
3/19	11	7.3	4½	
"	11	4.4	1½	RUN TO LUMBER YARD
3/20	11	7.3	5½	FINISHED
"	9	13.7	1½	2 CRACKED TILES
"	13	1.3	1½	BUILDING DEPT. - GOT PERMIT
3/21	12	8.1	4	
"	12.1	8.1	2	*ADDED 3-WAY SWITCH WIRING
"	12	4.7	2½	DUMP RUN
3 22	12	1.3	1	INSPECTION
"	12	10.3	7	HANG
		Total:		

Signed: John Smith

Date: 3/25/91

Figure 2. *Employees use this time card to record their hours each day with the proper work codes. The "notes" column is useful for tracking change orders and analyzing cost overruns.*

Job-Cost Summary Sheet

Work Code	Estimated* Costs	Actual* Costs	(+)=Made (–)=Lost	Unit Measure	Budgeted Unit Price	Actual Unit Price
1.3 Regulatory	$375	$358.50	+$16.50			
4.7 Clean-Up/Disposal	350	449.65	–99.65			
7.2 Wall Assemblies	250	270.78	–20.78			
7.3 Ceiling Assemblies	1,300	1,278.50	+21.50	256 s.f.	$5.08	$4.99
8.1 Electrical	3,100	2,975.49	+124.51			
8.3 Plumbing	650	718.25	–68.25			
8.4 Hvac	75	203.08	–128.08 ❶			
10.1 Insulation	75	86.84	–11.84			
10.3 Drywall	1,600	1,801.29	–201.29 ❷	768 s.f.	2.08	2.35
10.4 Plaster	350	425.00	–75.00 ❸	200 s.f.	1.75	2.13
10.6 Floor Finish	2,000	2,111.15	–111.15 ❹	256 s.f.	7.81	8.25
10.8 Ceramic Tile/Stone	1,350	1,298.08	+51.92	90 s.f.	15.00	14.42
10.9 Finish Carpentry	275	192.59	+82.41 ❺	131 l.f.	2.10	1.47
11.2 Cabinets	4,000	4,014.17	–14.17			
11.4 Lighting, Finish Electrical	550	446.66	+103.34			
11.5 Fixtures, Finish Plumbing	650	695.27	–45.27			
Whole Job:	$18,550	$18,831.42	–$281.42			
			–1.52% Cost Overrun On Original Estimate ❻			

* *These figures represent direct costs only; markups for overhead, profit, and contingencies are not included.*

❶ *This is my error. I just guesstimated and missed badly when custom sheet-metal work was needed.*

❷ *This one is important. I estimated drywall at $2/s.f., plus 4% contingency. We did the work in-house instead of subbing it out. Now I need to figure out whether to raise my square foot unit price, drive the production harder next time, or go back to subbing it out.*

❸ *My miscalculation again. The sub held to the $1.75/s.f. figure, but the job required about 240 s.f. — 40 s.f. more than I had figured.*

❹ *The subcontract price was good, but we did some prep work I didn't allow for.*

❺ *This was an experiment. I had no unit price for baseboard and casing when I did the estimate, so I did a "stick" estimate. After the job, I backed out the linear foot cost.*

❻ *Our overall cost performance was not too bad. The overrun is well below the 5% contingency I normally add on top of actual costs.*

Figure 3. *The author's job-cost summary sheet compares budgeted and actual costs for each work code. The "Made/Lost" column shows the difference between the two amounts. The last three columns help him fine-tune unit costs.*

the different phases of a job (see "Master List of Work Codes," page 19). I went overboard when I first started and tried to cover every possibility with a five-page list. I produced such a mass of information that it would have been a full-time job to analyze all of it.

The only way your list will help you is if every part of it makes sense and fits the way you run your business. My list roughly follows the chronological order of events for most jobs, beginning with design and contract development and ending with final cleanup and warranty work. If the first list you come up with seems too long, it probably is. Get rid of anything that is confusing or out of place.

I use a numbering system for work codes to make it easier to mark invoices and time cards, but if your list of work codes is shorter, you can do without numbers and just use phase names. For reference, I also give a description of what each work code includes. After you've used your list for awhile, you won't need to refer to it as often.

The last column on my list contains workers compensation codes. It's optional, but it has made a big difference in helping me control my labor costs (see "Tracking Labor," page 21).

Marking invoices. The next step is to mark every invoice from your suppliers and subcontractors with the proper codes. Your notations should include the job name or number, the work code, and the dollar amount (see Figure 1). You'll need to distinguish between contract work and noncontract work. I use a decimal variation on the job number to keep track of change orders. For example, if the job number is "50," the first change

Tracking Labor

Estimating labor is by far the biggest uncertainty in construction. Keeping track of how long it takes your workers to do certain tasks will help you build accurate unit prices for estimating labor. But it's important to include the many direct and indirect costs related to payroll.

Labor burden. Let's use my labor costs from last year as an example. In addition to wages, my direct cost for maintaining employees was just over 37% for carpenters. That means a carpenter's helper grossing $10/hour cost me $13.70/hour (37% more). The difference amounts to about $148 per week, and that's only for one employee making a moderate wage. Figures like these magnify any mistakes made in the estimating part of the game. That's why it's crucial when estimating and job costing to figure labor by its *cost to the employer* and not by the gross wage amount.

Dividing your payroll. The largest part of my labor burden is workers comp insurance, and I use my job-cost system to help keep my premiums to a minimum. Workers comp rates in California and many other states are assigned every year by a rating bureau according to trade (see chart). Roofers and house movers have the highest rates in construction, but the 24% rate for carpentry is next on the list. In fact, it's higher than the rates for police, firefighters, and test pilots. If you keep track of what your employees actually do — a process called "dividing your payroll" — you only have to pay the rate that applies to each task, not the higher base rate for carpentry. For example, the rate for hanging drywall is about 12%. If you know how many hours your employees spend hanging rock, you'll pay 12% less for insurance on that amount than for the carpentry work they do. It took perseverance to get my insurer to admit that I could divide my payroll, but it was worth it when I saved $900 the first year — almost 30% of my total premium.

— *P. T.*

Workers Comp Rates by Trade

Rate*	Description
14.7%	Landscape Gardening
14.6	Masonry
11.6	Plumbing
8.9	Electrical
10.2	Concrete-Residential
12.6	Rebar Installation
8.5	Ceramic Tile/Stone (Interior)
12.7	Hardwood Floor Laying & Finishing
11.6	Drywall
17.2	Painting
18.1	Plaster/Stucco
14.7	Sheet Metal (Hvac) <$16/hr.
39.8	Roofing
24.0	Carpentry (<$17/hr.)
7.9	Grading
10.2	Caissons
1.0	Clerical

*California rates for 1990

Workers comp rates differ depending upon the type of work done. The author has found he can reduce his premiums by dividing the payroll according to the tasks performed, as documented on his employees' time cards.

order is "50.1," the second is "50.2," and so on.

A single invoice often contains materials used in several different phases, so it's important to check each line item and apply the proper work code. If you have a single supplier bringing materials for many different parts of the job, place your order by grouping the materials according to your work codes, or ask your supplier to prepare separate invoices. If you have a purchase order system, coordinate it with your work codes list.

Marking time cards. Recording labor is, without question, both the hardest paperwork chore to get done and the most valuable one for your business. Marking invoices is tedious, but it's small potatoes compared to getting your employees to fill out their time cards. Never have I heard such complaining and whining as when I insisted that my employees write down what they did each day. I call this the "secretary syndrome," as in, "I'm a carpenter, not a secretary."

I make it as painless as possible by providing plenty of room on the time card (see Figure 2), and by supplying each employee with a copy of the work code list. If your list is shorter than mine, you might consider including it right on the time card.

Budget vs. Actual

After you've marked all invoices and time cards, enter the costs into your job-cost system. You'll need a total amount for each work code to represent actual costs. Also, calculate separate subtotals for labor and materials for each work code; this will help with analysis later.

Transfer your budgeted costs from your estimate and your actual costs from the invoices and time cards to a job-cost summary sheet (see Figure 3). The "Made/Lost" column calculates the difference between budgeted and actual costs. The totals of each column summarize the whole job.

Actual costs that are higher than budgeted costs are most important, since this means you're losing money. However, lower actual costs could mean you're not as competitive in your bidding as you could be. If actual costs are significantly higher or lower than what you estimated, look for the reason and make the appropriate adjustments. If there's a problem with the estimate, either adjust your prices or, in the case of an oversight, try to be more thorough. If there's a production problem, look for ways to improve efficiency and labor supervision.

No Budget

What if you don't have a budget figure to compare to actual costs? What if you just flat-out guessed a lump sum for the entire project and hoped for the best? You can still look back at the job after it's done to see what your estimate should have been. In fact, if your record-keeping is accurate and complete, and if you take some time to break the job down into basic units of measure (linear feet of wall framing, for example), then the job-cost analysis will give you your first genuine set of actual unit prices. Even if you completely lose your shirt, you can come away with valuable information that will keep you from losing another shirt next time. ■

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