

Acknowledgments

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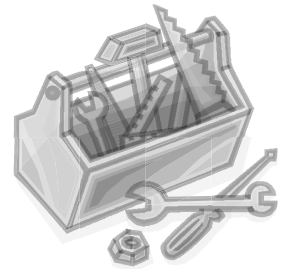
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Pricing Home Improvement Jobs

1



Estimating home improvement costs requires specialized skills. You can't price home improvement work the same way you'd price new construction. The proportion of labor expense is greater. There's far more risk because there are far more variables and unknowns. An example will make this clear.

Hanging doors in new construction is a 1-2-3 affair. You know ahead of time exactly what's required. You built the wall, installed the frame and know each door will fit right the first time. There won't be any surprises. An experienced estimator can forecast the cost of hanging a door in a new home with a high degree of certainty.

Now let's look at the same task on a home improvement project. First, remember that you may be hanging only one door. There's no chance to improve the production rate on second or later doors. Installing this door is probably different from the last door you installed on a similar project and will be different from your next door installation.

Work starts with removing the old door. That's probably not too hard — once you break through six coats of accumulated paint on the hinges. Let's assume you work carefully and don't damage the casing or trim. The next step is to install a blind Dutchman where the original hinges were attached. If the frame's badly chewed up from years of neglect and abuse, you'll have to remove and replace the entire frame. Don't forget that the building has settled over the years. The frame has probably twisted out of plumb. More time will be needed to shim and level the frame.

Finally the door is installed and swings smoothly. But the job still isn't finished. You have to paint the door to match and will certainly have to haul away the old door and the debris.

Every home improvement cost estimate comes with dozens of chances to make an expensive mistake. Surprises are inevitable and nearly all surprises will add to the cost, not reduce the cost. Estimating new construction is a snap by comparison.

All home improvement has similar problems:

- ❖ No chance for economies of scale (mass production),
- ❖ Difficulty in removing just enough of the old,
- ❖ Work doesn't follow the normal (from the ground, up) sequence of construction,
- ❖ Difficulty adding new materials to deteriorated or nonstandard existing materials,
- ❖ The need to match designs, colors and textures,
- ❖ Covering up for another contractor's mistakes,
- ❖ Struggling to get access to the place where the work is to be done,
- ❖ Protecting adjacent surfaces and pathway to the work area,
- ❖ Initial uncertainty about how much work is needed.

If you're an experienced home improvement contractor, you understand this already. Whether experienced or not, you know full well that accurate pricing is crucial to survival in the home improvement business. Unfortunately, most home improvement specialists have far less experience in pricing their work than in getting the work done. No wonder so many home improvement companies sink into obscurity.

But it doesn't have to be that way.

The chapters that follow explain how to price each type of home improvement work. Emphasis will be on avoiding risk — pricing pitfalls that can turn any home improvement contract into a financial nightmare.

No Price Fits All Jobs

There's no single way to arrive at the correct price for home improvement work. Neither is there a single correct price for most home improvement projects. But there are both good and bad ways to estimate prices and there are good and bad prices for any proposed job. Your task as a home improvement estimator is to produce consistently good estimates on most jobs. If you're already doing that, congratulations. You don't need this book. Return it where you bought it and get a refund. But if you're not, information in the following chapters will make or save you many times what you paid for the book.

It's accepted wisdom among home improvement specialists that salespeople need authority to quote prices when closing a sale. When trying to wrap up a deal, there's no substitute for having current cost information at your fingertips. That's especially true on larger jobs where you've prepared detailed plans and a written estimate. The owner will have questions and suggestions that change the job specs. If you want to close the sale then and there, you'd better know how much to add or subtract for each change the owner wants.

Most home improvement companies authorize salespeople to quote prices from an approved list in a price book. That simplifies the salesperson's job, eliminates most major errors, and saves the owner of the company from approving every item in every estimate. In our opinion, quoting from a price book is the only way to build sales volume in the home improvement business. That means every home improvement contractor needs a good price book.

Of course, the best price book for your company would be based on your actual cost experience — work done by your crews on your jobs with materials from your dealers and installed by your subcontractors. Since every contractor uses different crews, subcontractors and suppliers, every price book should be different. And, of course, prices in the company price book should be revised regularly to reflect current labor and material costs.

Having admitted that there's no substitute for developing your own price book, we'll suggest that you not bother. Most home improvement contractors don't have the time or patience to maintain current installed prices for thousands of repair and

remodeling items. Even if you did, spending hundreds of hours a year keeping a price book current would be a waste of time. Prices for home improvement work are usually negotiated on site. There's little value in keeping a book of exact costs if you have to cut a special deal to close each sale.

Instead, we suggest that you let this manual serve as your company price book. Using the prices in this book (and included software download) will eliminate most of the common estimating mistakes. If your labor costs are higher or if your crews aren't as skilled as most tradesmen, you may have to increase the selling prices listed here to make a reasonable profit. And, of course, sometimes you're going to have a job with costs that exceed what any reasonable estimate could have predicted. This manual isn't a substitute for the exercise of good judgment. That's always your job.

Cost Plus Markup Equals Selling Price

The figures in this manual show both costs to the contractor and a recommended selling price. The difference between your cost and your selling price is your markup. Markup varies widely, far more than either material cost or labor cost. You're the final authority on markup. You decide what markup fits best — based on market conditions, your client, and the profit you feel is reasonable. Once you decide on the "right" markup, it's easy to plug that percentage into the bid, assuming you use National Estimator.

Every construction contractor needs to distinguish between "markup" and "profit." Markup is what you add to estimated labor and material costs (usually called "hard costs") to find the selling price. Profit is what you have left when all bills have been paid. The two are very different. Profit is just the frosting on the cake.

Markup is also different from "margin." Figure 1-1 shows percentages of markup for various levels of hard costs. For example, if your markup on a \$20,000 job is 50 percent, the selling price will be \$30,000. The margin on that job is 33 percent, \$10,000 divided by the selling price of \$30,000. (Note the bottom row in Figure 1-1.) Margin is what's left after hard costs are recovered, and includes profit.

Markup vs. Margin				
Hard Cost	Price at 50% Markup	Price at 70% Markup	Price at 100% Markup	Price at 150% Markup
\$50	\$75	\$85	\$100	\$125
\$100	\$150	\$170	\$200	\$250
\$200	\$300	\$340	\$400	\$500
\$300	\$450	\$510	\$600	\$750
\$400	\$600	\$680	\$800	\$1,000
\$500	\$750	\$850	\$1,000	\$1,250
\$1,000	\$1,500	\$1,700	\$2,000	\$2,500
\$2,000	\$3,000	\$3,400	\$4,000	\$5,000
\$3,000	\$4,500	\$5,100	\$6,000	\$7,500
\$4,000	\$6,000	\$6,800	\$8,000	\$10,000
\$5,000	\$7,500	\$8,500	\$10,000	\$12,500
\$6,000	\$9,000	\$10,200	\$12,000	\$15,000
\$7,000	\$10,500	\$11,900	\$14,000	\$17,500
\$8,000	\$12,000	\$13,600	\$16,000	\$20,000
\$9,000	\$13,500	\$15,300	\$18,000	\$22,500
\$10,000	\$15,000	\$17,000	\$20,000	\$25,000
\$11,000	\$16,500	\$18,700	\$22,000	\$27,500
\$12,000	\$18,000	\$20,600	\$24,000	\$30,000
\$13,000	\$19,500	\$22,100	\$26,000	\$32,500
\$14,000	\$21,000	\$23,800	\$28,000	\$35,000
\$15,000	\$22,500	\$25,500	\$30,000	\$37,500
\$16,000	\$24,000	\$27,200	\$32,000	\$40,000
\$17,000	\$25,500	\$28,900	\$34,000	\$42,500
\$18,000	\$27,000	\$30,600	\$36,000	\$45,000
\$19,000	\$28,500	\$32,300	\$38,000	\$47,500
\$20,000	\$30,000	\$34,000	\$40,000	\$50,000
\$30,000	\$45,000	\$51,000	\$60,000	\$75,000
\$40,000	\$60,000	\$68,000	\$80,000	\$100,000
\$50,000	\$75,000	\$85,000	\$100,000	\$125,000
Hard Cost	33% Margin	41% Margin	50% Margin	60% Margin

Figure 1-1

Markup (based on cost) vs. Margin (based on selling price)

Many successful home improvement contractors find they can stay in business if hard costs are 59 percent of selling price. Hard costs include material expense, subcontract costs and labor (including taxes and insurance). The other 41 percent of selling price (“margin”) compensates the sales staff, covers overhead, supervision and contingency, and should yield a modest profit. From Figure 1-1, you can see that markup on hard costs has to be 70 percent to yield a margin of 41 percent.

To put this formula to work in your home improvement company, add 70 percent to your hard costs to find the selling price. Of course, some jobs need more markup and others can get by on less. A smaller job with more risk done for a demanding client may require greater markup. A larger job done mostly by subcontractors can usually carry a smaller markup.

Home improvement contractors have all the overhead of any business: office rent, telephone, owner’s salary, office salaries, legal and accounting expense, insurance, auto and truck expense, and more. But unlike other contractors, home improvement specialists routinely deal with high risk from both the unknown and the unknowable — at least until work actually begins. Since most of what you didn’t or couldn’t anticipate will inflate your costs, you’re assuming significant risk. That’s why markups for home improvement work have to be higher than for new construction.

Naturally, competition dictates markup. If you’re not getting enough work at 70 percent markup, maybe 70 percent is too much for your area. But remember that you shouldn’t have to bid remodeling work on a level playing field. New construction usually goes to the lowest responsible bidder. A creative salesman who follows the recommendations in this book has an advantage over lowball bidders who rely on price alone to sell their services.

If you have trouble using *National Estimator*, we’ll be glad to help, and we don’t charge you for it.

Free telephone assistance is available from 8 a.m. until 5 p.m. Pacific time Monday through Friday (except holidays). Call 760-438-7828, Ext. 2.

This Book Works Two Ways



When the *National Estimator* program has been installed, click Help on the menu bar to see a list of topics that will get you up and running. Or, go online to www.craftsman-book.com and click on Support, then Tutorials, to view an interactive tutorial for *National Estimator*.

Estimates That Work Two Ways

This manual is designed for use by both the owner of a home improvement business and by company sales staff. Prices shown in this manual include both hard costs (labor and material) and a recommended selling price (usually based on 70 percent markup). Sales staff will use the selling price.

Figure 1-2 shows the last page of an estimate for the Stillwel room addition, including 70 percent markup. The company estimator created this estimate from a job survey prepared by a sales representative. Figure 1-2 is for company use and was created in the National Estimator program.

Qty	Craft@Hours	Unit	Material	Labor	Equipment	Total
Roll & brush 1 coat of water base undercoat on interior flush doors						
Medium .3 MH/Door, 11.5 Doors/Gal						
3.00	2P@.9000	Ea	5.07	21.36	0.00	26.43
Roll & brush 1st finish coat of water base enamel on interior flush doors						
Medium .25 MH/Door, 12.5 Doors/Gal						
3.00	2P@.7500	Ea	5.39	17.80	0.00	23.18
Roll & brush 1 coat water base undercoat on vanity cabinet						
Medium 93 SF/MH, 250 SF/Gal						
0.90	2P@.9720	CSF	6.99	23.06	0.00	30.05
Roll & brush 1st finish coat of water base enamel on vanity cabinet						
Medium 103 SF/MH, 288 SF/Gal						
0.90	2P@.8740	CSF	7.02	20.70	0.00	27.72
Roll 1st coat of water base stain on rough sawn or resawn wood siding						
Medium 225 SF/MH, 213 SF/Gal						
17.00	2P@7.548	CSF	157.08	178.50	0.00	335.58
Roll 2nd coat of water base stain on rough sawn or resawn wood siding						
Medium 275 SF/MH, 273 SF/Gal						
17.00	2P@6.188	CSF	122.63	146.73	0.00	269.36
**Subtotal: Painting						
	40.7		1,014.54	973.46	0.00	1,988.00
Total Manhours, Material, Labor, and Equipment:						
	456.0		18,641.82	11,675.42	540.29	30,857.53
Total Only (Subcontract) Costs:						
						4,028.33
Subtotal:						34,885.85
70.00% Markup:						24,420.10
Estimate Total:						59,305.95

Figure 1-2

Estimate with a 70 percent markup shown

Figure 1-3 shows the last page of a proposal for the same job. This is what the customer sees. It was created by the Job Cost Wizard program. Both National Estimator and Job Cost Wizard are included in the free download that comes with this book. Notice that the total is nearly the same in both documents, \$59,305.95. Figure 1-2, the estimate, shows 70 percent markup on hard costs. Figure 1-3, the proposal, doesn't show the markup at all. Instead, markup has been distributed proportionately throughout each cost item in the job. Job Cost Wizard does this distribution at the click of a button.

Craftsman Construction		Proposal	
6058 Corte del Cedro Box 6500 Fairfield, GA 30456 856-3806		Date	Estimate #
		8/3/17	494
		Customer	Job
		Bill Stillwel	Room Addition
Description	Qty	Rate	Amount
Roll & brush 1st finish coat of water base enamel on vanity cabinet. Medium 103 SF/MH, 288 SF/Gal			
Material, per CSF	0.90	13.26	11.94
Labor, per CSF	0.90	39.09	35.18
Roll 1st coat of water base stain on rough sawn or resawn wood siding. Medium 225 SF/MH, 213 SF/Gal			
Material, per CSF	17	15.71	267.04
Labor, per CSF	17	17.85	303.45
Roll 2nd coat of water base stain on rough sawn or resawn wood siding. Medium 275 SF/MH, 273 SF/Gal			
Material, per CSF	17	12.26	208.47
Labor, per CSF	17	14.67	249.44
*Painting subtotal			3,379.60
*Project Subtotal			59,305.96
*Project Total			59,305.96

Figure 1-3

Proposal for the same job not showing the markup

Once an estimate is finished in the National Estimator program and saved to computer disk, press **Ctrl** on your keyboard and tap the letter **J** to convert the estimate into a proposal in Job Cost Wizard. You can't make changes in the Job Cost Wizard screen. But it's easy to toggle back to National Estimator program (press **Alt** and tap the **Tab** key), make a change, and then press **Ctrl-J** once again.

Job Cost Wizard offers dozens of choices on what you show and don't show in written proposals. Your bids can be long (full description for everything in the estimate) or short (only a summary of each category). You can show or hide labor and material cost detail. You can show or hide markup and profit.

Once work begins, you'll want to monitor job expenses to be sure actual costs remain consistent with estimated costs. If you use QuickBooks to pay bills and figure payroll, let QuickBooks do the comparisons for you. Job Cost Wizard exports the proposal to QuickBooks, where you can prepare progress invoices and track expenses against estimates.

The National Estimator program lets you change anything in the costbook or even add your own estimated costs. Make the *National Home Improvement Estimator* your collection point for all estimating and pricing information. Anything you add to the costbook shows up in red and can be migrated to later editions of this manual when available. The *National Home Improvement Estimator* starts out as your most useful estimating reference. What you add to the costbook will make it even more valuable.

Job Survey (Scope of Work)

Of course, neither a good price book nor a computer estimating program will solve all of your estimating problems. Computers seldom make mistakes in addition or multiplication. But nothing prevents you from making expensive estimating mistakes on your own. By far the most common estimating mistake will be omitting something essential to the job.

Get in the habit of completing an exhaustive job survey before beginning any estimate for home improvement work. Some of your estimates on a job may be too high. Other estimates on a job may be too low. With any luck, your over-estimates will roughly balance with your under-estimates, leaving the job total about where it should be. But the estimated price for anything omitted from a job survey is always zero. That's a 100 percent miss. It's hard to balance a complete miss with anything. A few of those can create a financial disaster.

Material Costs in This Book

Material costs for each item are listed in the column headed Material. These are neither retail nor wholesale prices. They are estimates of what most contractors who buy in moderate volume will pay suppliers as of mid-2017. Discounts may be available for purchases in larger volumes.

Add Delivery Expense to the material cost for other than local delivery of reasonably large quantities. Cost of delivery varies with the distance from source of supply, method of transportation, and quantity to be delivered. But most material dealers absorb the delivery cost on local delivery (5 to 15 miles) of larger quantities to good customers. Add the expense of job site delivery when it's a significant part of the material cost.

Add Sales Tax when sales tax will be charged to the contractor buying the materials. In some states, contractors have to collect sales tax based on the contract price. No matter what your state (or county) requires, National Estimator can handle the task. Click **Edit** on the National Estimator menu bar. Then click **Sales Tax**.

Waste and Coverage Loss is included in the installed material cost. The cost of many materials per unit after installation is greater than the purchase price for the same unit because of waste, shrinkage or coverage loss during installation. For example, about 120 square feet of nominal 1" x 4" square edge boards will be needed to cover 100 square feet of floor or wall. There's no coverage loss with plywood sheathing, but waste due to cutting and fitting will average about 6 percent.

Costs in the Material column of this book assume normal waste and coverage loss. Small and irregular jobs may require a greater waste allowance. Materials priced without installation (with no labor cost) don't include an allowance for waste and coverage except as noted.

Labor Costs for installing the material or doing the work described are listed in the column headed Labor. The labor cost per unit is the labor cost per hour multiplied by the manhours per unit shown after the @ sign in the Craft@Hrs column. Labor cost includes the basic wage, the employer's contribution to welfare, pension, vacation and apprentice funds, and all tax and insurance charges based on wages.

Supervision Expense to the general contractor isn't included in the labor cost. The cost of supervision and non-productive labor varies widely from job to job. Calculate the cost of supervision and non-productive labor and add this to the estimate.

Payroll Taxes and Insurance are included in the labor cost. See the following section for more on the "contractor's burden."

Manhours per Unit and the Craft performing the work are listed in the Craft@Hrs column. To find the units of work done per worker in an 8-hour day, divide 8 by the manhours per unit. To find the units done by a crew in an 8-hour day, multiply the units per worker per 8-hour day by the number of crew members.

Manhours include all productive labor normally associated with installing the materials described.

This will usually include tasks such as:

- ❖ Unloading and storing construction materials, tools and equipment on site.
- ❖ Moving tools and equipment from a storage area or truck on site at the beginning of the day.
- ❖ Returning tools and equipment to a storage area or truck on site at the end of the day.
- ❖ Normal time lost for work breaks.
- ❖ Planning and discussing the work to be performed.
- ❖ Normal handling, measuring, cutting and fitting.
- ❖ Keeping a record of the time spent and work done.
- ❖ Regular cleanup of construction debris.
- ❖ Infrequent correction or repairs required because of faulty installation.

Adjust the Labor Cost to the job you're figuring when your actual hourly labor cost is known or can be estimated. The labor costs listed in Figure 1-5 will apply within a few percent on many jobs. But labor costs may be much higher or much lower on the job you're estimating.

If the hourly wage rates listed in Figure 1-5 aren't accurate, divide your known or estimated cost per hour by the listed cost per hour. The result is your adjustment for any figure in the Labor column for that craft.

Adjust for Unusual Labor Productivity. Costs in the Labor column are for normal conditions: experienced craftsmen working on reasonably well-planned and managed home improvement projects with fair to good productivity. Labor estimates assume that materials are standard grade, appropriate tools are on hand, work done by other crafts is adequate, layout and installation are relatively uncomplicated, and working conditions don't slow progress.

Working conditions at the jobsite have a major effect on labor cost. Estimating experience and careful analysis can help you predict the effect of most changes in working conditions. Obviously, no single adjustment will apply on all jobs. But the adjustments that follow should help you produce more accurate labor estimates. More than one condition may apply on a job.

Jobsite conditions affect labor costs

- ❖ Add 10% to 15% when working temperatures are below 40 degrees or above 95 degrees.
- ❖ Add 30% to 35% when temperatures are below 20 degrees. Materials and tools are hard to handle. Bulky clothing restricts freedom of movement.
- ❖ Add 15% to 25% for work on a ladder or a scaffold, in a 36" crawl space, in a congested area, or remote from the material storage point.
- ❖ Add 50% for work in an 18" to 36" crawl space. Allow extra time for cleaning out the area before work begins.
- ❖ Add 200% if portions of the crawl space are less than 18". Allow extra time for passing tools and materials. Few contractors bid on work like this.
- ❖ Deduct 10% when the work is in an open area with excellent access and good light.
- ❖ Add 1% for each 10 feet that materials must be lifted above ground level.
- ❖ Add 5% to 50% for tradesmen with below-average skills. Deduct 5% to 25% for highly-motivated, highly-skilled tradesmen.
- ❖ Deduct 10% to 20% when an identical task is repeated many times for several days at the same site.
- ❖ Add 20% to 50% on small jobs where fitting and matching of materials is required, adjacent surfaces have to be protected and the job site is occupied during construction.
- ❖ Add 25% to 50% for work done following a major flood, fire, earthquake, hurricane or tornado while skilled tradesmen are not readily available. Material costs may also be higher after a major disaster.
- ❖ Add 10% to 35% for demanding specs, rigid inspections, unreliable suppliers, a difficult owner or an inexperienced architect.

Use an Area Modification Factor from pages 18 through 26 if your material, hourly labor or equipment costs are unknown and can't be estimated. Here's how: Use the labor and material costs in this manual without modification. Then add or deduct the percentages shown for labor, material and equipment.

Equipment Costs for small tools and expendable supplies (such as saws and tape) are usually considered overhead expense and are covered by your markup. Equipment costs for larger equipment (such as a compressor or backhoe) should be

based on the rental rate for the period needed. Equipment rental costs are included in sections where heavy equipment may be needed.

Labor and Material Costs Change. These costs were compiled in the fall of 2016 and projected to mid-2017 by adding a small percentage. This projection will be accurate for some materials and inaccurate for others. No one can predict material price changes accurately.

How Accurate Are These Figures? They're as accurate as possible considering that the estimators who wrote this book don't know your subcontractors or material suppliers, haven't seen the plans or specifications, don't know what building code applies or where the job is, had to project material costs at least six months into the future, and had no record of how much work the crew that will be assigned to the job can handle.

You wouldn't bid a job under those conditions. And we don't claim that all construction is done at these prices.

Estimating Is an Art, not a science. On many jobs the range between high and low bid will be 20 percent or more. There's room for legitimate disagreement on what the correct costs are, even when complete plans and specifications are available, the date and site are established, and labor and material costs are identical for all bidders.

No cost fits all jobs. Good estimates are custom-made for a particular project and a single contractor through judgment, analysis and experience.

This book isn't a substitute for judgment, analysis and sound estimating practice. It's an *aid* in developing an *informed opinion* of cost. If you're using this book as your sole cost authority for contract bids, you're reading more into these pages than the editors intend.

Use These Figures to compile preliminary estimates, when a "snap" bid is needed to close the deal, and when no actual costs are available. This book will reduce the chance of error or omission on bid estimates, speed "ball park" estimates, and be a good guide when there's no time to get a quote.

Where Do We Get These Figures? From the same sources all professional estimators use: material suppliers, material price services, analysis of plans, specifications, estimates and completed project costs, and both published and unpublished cost studies compiled by both private and government agencies. In addition, we conduct nationwide mail and phone surveys and have the use of several major national estimating databases.

We'll Answer Your Questions about any part of this book and explain how to apply these costs. Free telephone assistance is available from 8 a.m. until 5 p.m. Pacific time Monday through Friday except holidays. Phone 760-438-7828, Ext. 2. We don't accept collect calls and can't estimate the job for you. But if you need clarification on something in this manual, we can help.

Labor Costs and Crews

Throughout this manual you'll see a column headed *Craft@Hrs.* Letters and numbers in this column show our estimates of:

- ❖ Who will do the work (the craft code)
- ❖ An @ symbol which means at
- ❖ How long the work will take (manhours).

For example, in Chapter 4, page 70, you'll find estimates for installing BC plywood wall sheathing by the square foot. The Craft@Hrs column opposite 1/2" plywood wall sheathing shows:

B1@.016

That means we estimate the installation rate for crew B1 at 0.016 manhours per square foot. That's the same as 16 manhours per 1,000 square feet.

Figure 1-4 is a table that defines each of the craft codes used in this book. Notice that crew B1 is composed of two craftsmen: one laborer and one carpenter. To install 1,000 square feet of 1/2" BC wall sheathing at 0.016 manhours per square foot, that crew would need 16 manhours (one 8-hour day for a crew of two).

Notice also in the table that the cost per manhour for crew B1 is listed as \$33.31. That's the average for a laborer (listed at \$29.82 per hour) and a carpenter (listed at \$36.79 per hour): \$29.82 plus \$36.79 is \$66.61. Divide by 2 to get \$33.31, the average cost per manhour for crew B1.

In the table, the cost per manhour is the sum of hourly costs of all crew members divided by the number of crew members. That's the average cost per manhour.

Costs in the Labor column in this book are the product of the installation time (in manhours) multiplied by the cost per manhour. For example, in Chapter 4, the labor cost listed for 1/2" BC wall sheathing is \$0.53 per square foot. That's the installation time (0.016 manhours per square foot) multiplied by \$33.31, the average cost per manhour for crew B1.

Figure 1-5 shows hourly labor costs components — base wage, typical fringe benefits, payroll taxes, insurance and the total hourly cost.

The labor costs shown in Column 6 were used to compute the manhour costs for crews and the figures in the Labor column.

Craft Codes		
Craft Code	Cost Per Manhour	Crew Composition
B1	\$33.31	1 laborer, 1 carpenter
B2	\$24.47	1 laborer, 2 carpenters
B3	\$32.14	2 laborers, 1 carpenter
B4	\$36.80	1 laborer, 1 operating engineer, 1 reinforcing iron worker
B5	\$36.41	1 laborer, 1 carpenter, 1 cement mason, 1 operating engineer, 1 reinforcing iron worker
B6	\$32.35	1 laborer, 1 cement mason
B7	\$30.20	1 laborer, 1 truck driver
B8	\$35.88	1 laborer, 1 operating engineer
B9	\$32.47	1 bricklayer, 1 bricklayer's helper
BB	\$37.29	1 bricklayer
BC	\$36.79	1 carpenter
BE	\$39.84	1 electrician
BF	\$33.63	1 floor layer
BG	\$35.51	1 glazier
BH	\$27.64	1 bricklayer's helper
BL	\$29.82	1 laborer
BR	\$35.28	1 lather
BS	\$32.63	1 marblesetter
CF	\$34.87	1 cement mason
CT	\$34.67	1 mosaic & terrazzo worker
D1	\$35.76	1 drywall installer, 1 drywall taper
DI	\$35.78	1 drywall installer
DT	\$35.73	1 drywall taper
HC	\$28.87	1 plasterer helper
OE	\$41.93	1 operating engineer
P1	\$36.24	1 laborer, 1 plumber
PM	\$42.65	1 plumber
PP	\$33.67	1 painter, 1 laborer
PR	\$36.83	1 plasterer
PT	\$37.51	1 painter
R1	\$35.48	1 roofer, 1 laborer
RI	\$38.66	1 reinforcing iron worker
RR	\$41.13	1 roofer
SW	\$41.40	1 sheet metal worker
T1	\$32.40	1 tile layer, 1 laborer
TL	\$34.98	1 tile layer
TR	\$30.57	1 truck driver

Figure 1-4

Craft codes used in this manual

Hourly Labor Cost						
	1	2	3	4	5	6
Craft	Base wage per hour	Taxable fringe benefits (5.48% of base wage)	Insurance and employer taxes (%)	Insurance and employer taxes (\$)	Non-Taxable fringe benefits (4.84% of base wage)	Total hourly cost used in this book
Bricklayer	\$27.20	\$1.49	25.39%	\$7.28	\$1.32	\$37.29
Bricklayer's Helper	20.16	1.10	25.39	5.40	0.98	27.64
Building Laborer	20.57	1.13	32.81	7.12	1.00	29.82
Carpenter	25.59	1.40	31.71	8.56	1.24	36.79
Cement Mason	25.87	1.42	23.18	6.33	1.25	34.87
Drywall Installer	26.46	1.45	23.61	6.59	1.28	35.78
Drywall Taper	26.42	1.45	23.61	6.58	1.28	35.73
Electrician	30.35	1.66	19.86	6.36	1.47	39.84
Floor Layer	24.82	1.36	23.86	6.25	1.20	33.63
Glazier	25.82	1.41	25.83	7.03	1.25	35.51
Lather	26.56	1.46	21.31	5.97	1.29	35.28
Marble Setter	24.55	1.35	21.39	5.54	1.19	32.63
Millwright	26.03	1.43	21.27	5.84	1.26	34.56
Mosaic & Terrazzo Worker	26.09	1.43	21.39	5.89	1.26	34.67
Operating Engineer	30.61	1.68	25.27	8.16	1.48	41.93
Painter	27.46	1.50	24.92	7.22	1.33	37.51
Plasterer	26.20	1.44	28.65	7.92	1.27	36.83
Plasterer Helper	20.54	1.13	28.65	6.21	0.99	28.87
Plumber	31.37	1.72	24.30	8.04	1.52	42.65
Reinforcing Ironworker	27.50	1.51	28.67	8.32	1.33	38.66
Roofer	26.19	1.44	44.28	12.23	1.27	41.13
Sheet Metal Worker	30.04	1.65	26.06	8.26	1.45	41.40
Sprinkler Fitter	30.82	1.69	25.12	8.17	1.49	42.17
Tile Layer	26.33	1.44	21.39	5.94	1.27	34.98
Truck Driver	22.15	1.21	26.27	6.14	1.07	30.57

Figure 1-5*Components of hourly labor costs*

It's important that you understand what's included in the figures in each of the six columns in the table. Here's an explanation:

Column 1, the base wage per hour, is the craftsman's hourly wage. These figures are representative of what many contractors will be paying craftsmen working on home improvement jobs in 2017.

Column 2, taxable fringe benefits, includes vacation pay, sick leave and other taxable benefits. These fringe benefits average 5.48 percent of the base wage for many construction contractors. This benefit is in addition to the base wage.

Column 3, insurance and employer taxes in percent, shows the insurance and tax rate for construction trades. The cost of insurance in this column includes workers' compensation and contractor's casualty and liability coverage. Insurance rates vary

widely from state to state and depend on a contractor's loss experience. Note that taxes and insurance increase the hourly labor cost by 30 to 35 percent for most trades. There is no legal way to avoid these costs.

Column 4, insurance and employer taxes in dollars, shows the hourly cost of taxes and insurance for each construction trade. Insurance and taxes are paid on the costs in both columns 1 and 2.

Column 5, non-taxable fringe benefits, includes employer paid non-taxable benefits such as medical coverage and tax-deferred pension and profit sharing plans. These fringe benefits average 4.84 percent of the base wage for many construction contractors. The employer pays no taxes or insurance on these benefits.

Column 6, the total hourly cost in dollars, is the sum of columns 1, 2, 4 and 5.

These hourly labor costs will apply within a few percent on many jobs. But wage rates may be much higher or lower in the area where you do business. We recommend using your actual labor cost rather than national averages. That's easy with the National Estimator program. When copying and pasting any cost to your estimate, adjust the assumed hourly labor cost to your actual cost. You need do this only once for each trade. And you can make this adjustment at any time. Any change you make is applied to that trade throughout the estimate.

Abbreviations			
4WD	four-wheel drive	EPA	Environmental Protection Agency
ABS	acrylonitrile butadiene styrene	F	Fahrenheit
AC	alternating current	GFCI	ground fault circuit interrupter
ACQ	Alkaline Copper Quat	GRS	galvanized rigid steel
ADA	Americans with Disabilities Act	H	height
ANSI	American Nat. Standards Institute	HOM	higher order mode
APP	atactic polypropylene	HP	horsepower
ASTM	Amer. Society for Testing Materials	HVAC	heating, ventilating & air cond.
AWG	American Wire Gauge	ID	inside diameter
BF	board foot	IMC	intermediate metal conduit
Btr	better	KD	kiln dried
Btu(s)	British thermal unit(s)	KO	knockout
C	Celsius/Centigrade	kW	kilowatt(s)
CF	cubic foot	L	length
CFM	cubic feet per minute	Lb(s)	pound(s)
CLF	100 linear feet	LF	linear foot
CPM	cycles per minute	LS	lump sum
CSF	100 square feet	MBF	1,000 board feet
CY	cubic yard	MDF	medium density fiberboard
d	penny	mm	millimeter(s)
D	depth	Mo	month
DWV	drain, waste & vent	MPH	miles per hour
Ea	each	MSF	1,000 square feet
EMT	electric metallic tube	NEC	National Electrical Code
		NEMA	National Electrical Manufacturer's Assoc.
		OC	spacing from center to center
		OD	outside diameter
		OSB	oriented strand board
		OSHA	Occupational Safety & Health Admin.
		oz.	ounce(s)
		PSI	pounds per square inch
		PVC	polyvinyl chloride
		R	thermal resistance
		S4S	surfaced 4 sides
		SBS	styrene butadiene styrene
		SF	square foot
		SFCA	(per) square foot of contact area
		Sq	100 square feet
		Std	standard
		SY	square yard
		T	thick
		T&G	tongue & groove edge
		UL	Underwriter's Laboratory
		USDA	United States Dept. of Agriculture
		UV	ultraviolet
		W	width
		X	by or times

Figure 1-6

Abbreviations used in this manual

Area Modification Factors

Construction costs are higher in some areas than in other areas. Add or deduct the percentages shown on the following pages to adapt the costs in this book to your jobsite. Adjust your cost estimate by the appropriate percentages in this table to find the estimated cost for the site selected. Where 0% is shown, it means no modification is required.

Modification factors are listed by state and province. Areas within each state are listed by the first three digits of the postal zip code. For convenience, one representative city is identified in each three-digit zip or range of zips. Percentages are based on the average of all data points in the table. Factors listed for each state and province are the average of all data in that state or province. Figures for the zips are the average of all information in that area. And figures in the Total column are the weighted average of factors for Labor, Material and Equipment.

The National Estimator program will apply an area modification factor for any five-digit zip you select. Click Utilities. Click Options. Then select the Area Modification Factors tab.

These percentages are composites of many costs and will not necessarily be accurate when estimating the cost of any particular part of a building. But when used to modify costs for an entire structure, they should improve the accuracy of your estimates.

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Alabama Average		-1	-7	0	-4%	Arizona Average		1	-9	0	-4%
Anniston	362	-3	-13	-1	-8%	Chambers	865	1	-19	0	-8%
Auburn	368	-1	-8	0	-4%	Douglas	855	0	-18	0	-8%
Bellamy	369	-2	13	-1	5%	Flagstaff	860	2	-17	1	-7%
Birmingham	350-352	-3	8	-1	2%	Kingman	864	1	-11	0	-5%
Dothan	363	-1	-13	0	-7%	Mesa	852	1	5	0	3%
Evergreen	364	-1	-20	0	-10%	Phoenix	850	1	6	0	3%
Gadsden	359	-4	-15	-1	-9%	Prescott	863	3	-16	1	-6%
Huntsville	358	1	-3	0	-1%	Show Low	859	1	-18	0	-8%
Jasper	355	-1	-16	-1	-8%	Tucson	856-857	0	-10	0	-5%
Mobile	365-366	-1	-3	0	-2%	Yuma	853	0	5	0	2%
Montgomery	360-361	-1	-3	0	-2%	Arkansas Average		-2	-13	0	-7%
Scottsboro	357	0	-8	0	-4%	Batesville	725	0	-20	0	-9%
Selma	367	-1	-10	0	-5%	Camden	717	-4	1	-1	-2%
Sheffield	356	-1	1	0	0%	Fayetteville	727	0	-8	0	-4%
Tuscaloosa	354	1	-9	0	-4%	Fort Smith	729	-1	-14	0	-7%
Alaska Average		14	33	5	23%	Harrison	726	-1	-25	0	-12%
Anchorage	995	17	38	6	27%	Hope	718	-3	-15	-1	-8%
Fairbanks	997	16	40	5	27%	Hot Springs	719	-2	-25	-1	-13%
Juneau	998	18	20	6	19%	Jonesboro	724	-1	-18	0	-9%
Ketchikan	999	3	36	1	18%	Little Rock	720-722	-1	-6	0	-3%
King Salmon	996	16	32	5	23%	Pine Bluff	716	-4	-19	-1	-11%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Russellville	728	0	-9	0	-4%
West Memphis	723	-3	-1	-1	-2%
California Average		2	12	1	7%
Alhambra	917-918	3	15	1	8%
Bakersfield	932-933	0	4	0	2%
El Centro	922	1	-1	0	0%
Eureka	955	1	-12	0	-5%
Fresno	936-938	0	-5	0	-2%
Herlong	961	2	-8	1	-3%
Inglewood	902-905	3	16	1	9%
Irvine	926-927	3	24	1	13%
Lompoc	934	3	2	1	3%
Long Beach	907-908	3	17	1	9%
Los Angeles	900-901	3	13	1	8%
Marysville	959	1	-7	0	-3%
Modesto	953	1	2	0	1%
Mojave	935	0	11	0	5%
Novato	949	3	21	1	11%
Oakland	945-947	3	33	1	17%
Orange	928	3	22	1	12%
Oxnard	930	3	1	1	2%
Pasadena	910-912	4	16	1	9%
Rancho Cordova	956-957	2	6	1	4%
Redding	960	1	-8	0	-3%
Richmond	948	2	35	1	17%
Riverside	925	1	7	0	4%
Sacramento	958	1	6	0	3%
Salinas	939	3	-1	1	1%
San Bernardino	923-924	0	4	0	2%
San Diego	919-921	3	13	1	8%
San Francisco	941	3	55	1	27%
San Jose	950-951	3	33	1	17%
San Mateo	943-944	4	40	1	21%
Santa Barbara	931	3	11	1	7%
Santa Rosa	954	3	7	1	5%
Stockton	952	1	7	0	4%
Sunnyvale	940	3	39	1	20%
Van Nuys	913-916	3	14	1	8%
Whittier	906	3	14	1	8%
Colorado Average		2	1	1	1%
Aurora	800-801	3	11	1	7%
Boulder	803-804	3	5	1	4%
Colorado Springs	808-809	2	-3	1	0%
Denver	802	3	13	1	8%
Durango	813	1	-3	0	-1%
Fort Morgan	807	1	-6	0	-2%
Glenwood Springs	816	2	6	1	4%
Grand Junction	814-815	1	-1	0	0%
Greeley	806	3	8	1	5%
Longmont	805	3	1	1	2%
Pagosa Springs	811	0	-9	0	-4%
Pueblo	810	-1	2	0	0%
Salida	812	2	-15	1	-6%

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Connecticut Average		1	16	0	8%
Bridgeport	066	0	13	0	6%
Bristol	060	1	24	0	12%
Fairfield	064	2	17	1	9%
Hartford	061	0	23	0	11%
New Haven	065	1	15	0	7%
Norwich	063	0	7	0	3%
Stamford	068-069	4	21	1	12%
Waterbury	067	1	12	0	6%
West Hartford	062	1	9	0	5%
Delaware Average		1	3	0	2%
Dover	199	1	-9	0	-4%
Newark	197	2	10	1	6%
Wilmington	198	0	9	0	4%
District of Columbia					
Washington	200-205	2	23	1	12%
Florida Average		0	-10	0	-5%
Altamonte Springs	327	-1	-6	0	-3%
Bradenton	342	0	-12	0	-6%
Brooksville	346	0	-16	0	-7%
Daytona Beach	321	-2	-18	-1	-9%
Fort Lauderdale	333	3	1	1	2%
Fort Myers	339	0	-12	0	-6%
Fort Pierce	349	-2	-20	-1	-10%
Gainesville	326	-1	-18	0	-9%
Jacksonville	322	-1	-3	0	-2%
Lakeland	338	-3	-13	-1	-8%
Melbourne	329	-2	-15	-1	-8%
Miami	330-332	2	-1	1	1%
Naples	341	3	-8	1	-2%
Ocala	344	-3	-23	-1	-12%
Orlando	328	0	2	0	1%
Panama City	324	-2	-21	-1	-11%
Pensacola	325	0	-17	0	-8%
Saint Augustine	320	-1	-4	0	-2%
Saint Cloud	347	0	-5	0	-2%
St Petersburg	337	-1	-12	0	-6%
Tallahassee	323	0	-13	0	-6%
Tampa	335-336	-1	-1	0	-1%
West Palm Beach	334	1	-5	0	-2%
Georgia Average		-1	-7	0	-4%
Albany	317	-2	-10	-1	-6%
Athens	306	0	-11	0	-5%
Atlanta	303	3	23	1	12%
Augusta	308-309	-2	-2	-1	-2%
Buford	305	0	-5	0	-2%
Calhoun	307	-1	-19	0	-9%
Columbus	318-319	-1	-6	0	-3%
Dublin/Fort Valley	310	-3	-13	-1	-8%
Hinesville	313	-2	-11	-1	-6%
Kings Bay	315	-2	-19	-1	-10%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Macon	312	-2	-7	-1	-4%	Indiana Average		-2	-3	-1	-2%
Marietta	300-302	1	8	0	4%	Aurora	470	-1	-9	0	-5%
Savannah	314	-1	-7	0	-4%	Bloomington	474	1	-6	0	-2%
Statesboro	304	-2	-21	-1	-11%	Columbus	472	0	-9	0	-4%
Valdosta	316	-1	-1	0	-1%	Elkhart	465	-2	-7	-1	-4%
Hawaii Average		17	25	6	20%	Evansville	476-477	-2	12	-1	4%
Aliamanu	968	17	29	6	22%	Fort Wayne	467-468	-3	1	-1	-1%
Ewa	967	17	23	6	20%	Gary	463-464	-4	28	-1	11%
Halawa Heights	967	17	23	6	20%	Indianapolis	460-462	-1	10	0	4%
Hilo	967	17	23	6	20%	Jasper	475	-1	-14	0	-7%
Honolulu	968	17	29	6	22%	Jeffersonville	471	0	-11	0	-5%
Kailua	968	17	29	6	22%	Kokomo	469	-2	-15	-1	-8%
Lualualei	967	17	23	6	20%	Lafayette	479	-1	-9	0	-5%
Mililani Town	967	17	23	6	20%	Muncie	473	-4	-13	-1	-8%
Pearl City	967	17	23	6	20%	South Bend	466	-4	0	-1	-2%
Wahiawa	967	17	23	6	20%	Terre Haute	478	-4	-2	-1	-3%
Waianae	967	17	23	6	20%	Iowa Average		-2	-4	-1	-3%
Wailuku (Maui)	967	17	23	6	20%	Burlington	526	0	2	0	1%
Idaho Average		0	-19	0	-9%	Carroll	514	-3	-20	-1	-11%
Boise	837	1	-12	0	-5%	Cedar Falls	506	-1	-7	0	-4%
Coeur d'Alene	838	0	-21	0	-10%	Cedar Rapids	522-524	0	5	0	2%
Idaho Falls	834	-1	-19	0	-9%	Cherokee	510	-2	4	-1	1%
Lewiston	835	0	-24	0	-11%	Council Bluffs	515	-2	1	-1	-1%
Meridian	836	0	-19	0	-9%	Creston	508	-3	1	-1	-1%
Pocatello	832	-1	-20	0	-10%	Davenport	527-528	-1	3	0	1%
Sun Valley	833	0	-18	0	-8%	Decorah	521	-2	-14	-1	-8%
Illinois Average		-1	9	0	4%	Des Moines	500-503	-2	13	-1	5%
Arlington Heights	600	2	29	1	14%	Dubuque	520	-1	-7	0	-4%
Aurora	605	2	29	1	14%	Fort Dodge	505	-2	-5	-1	-3%
Belleville	622	-2	2	-1	0%	Mason City	504	0	-6	0	-3%
Bloomington	617	1	-4	0	-1%	Ottumwa	525	0	-13	0	-6%
Carbondale	629	-3	-6	-1	-4%	Sheldon	512	0	-15	0	-7%
Carol Stream	601	2	28	1	14%	Shenandoah	516	-3	-26	-1	-14%
Centralia	628	-3	-3	-1	-3%	Sioux City	511	-2	14	-1	5%
Champaign	618	-1	-3	0	-2%	Spencer	513	-1	-14	0	-7%
Chicago	606-608	2	31	1	15%	Waterloo	507	-4	-1	-1	-3%
Decatur	623	-2	-13	-1	-7%	Kansas Average		-2	-5	-1	-3%
Galesburg	614	-2	-6	-1	-4%	Colby	677	-1	-18	0	-9%
Granite City	620	-3	11	-1	3%	Concordia	669	-1	-25	0	-12%
Green River	612	-1	12	0	5%	Dodge City	678	-2	-7	-1	-4%
Joliet	604	0	29	0	13%	Emporia	668	-3	11	-1	3%
Kankakee	609	-2	-4	-1	-3%	Fort Scott	667	-2	-11	-1	-6%
Lawrenceville	624	-4	-9	-1	-6%	Hays	676	-2	-26	-1	-13%
Oak Park	603	3	35	1	18%	Hutchinson	675	-3	-9	-1	-6%
Peoria	615-616	-1	15	0	6%	Independence	673	-3	22	-1	9%
Peru	613	0	4	0	2%	Kansas City	660-662	0	10	0	5%
Quincy	602	3	31	1	16%	Liberal	679	-2	7	-1	2%
Rockford	610-611	-2	8	-1	3%	Salina	674	-3	-11	-1	-7%
Springfield	625-627	-2	2	-1	0%	Topeka	664-666	-3	2	-1	-1%
Urbana	619	-3	-6	-1	-4%	Wichita	670-672	-2	-6	-1	-4%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Kentucky Average						Massachusetts Average					
Ashland	411-412	-3	-5	-1	-4%	Ayer	015-016	1	11	0	6%
Bowling Green	421	0	-11	0	-5%	Bedford	017	3	30	1	15%
Campton	413-414	-1	-23	0	-11%	Boston	021-022	3	77	1	37%
Covington	410	-1	5	0	2%	Brockton	023-024	3	41	1	20%
Elizabethtown	427	-1	-20	0	-10%	Cape Cod	026	2	6	1	4%
Frankfort	406	1	13	0	7%	Chicopee	010	1	14	0	7%
Hazard	417-418	-1	-19	0	-9%	Dedham	019	3	36	1	18%
Hopkinsville	422	-2	-9	-1	-5%	Fitchburg	014	2	21	1	11%
Lexington	403-405	1	1	0	1%	Hingham	020	3	37	1	19%
London	407-409	-1	-13	0	-7%	Lawrence	018	2	28	1	14%
Louisville	400-402	-1	5	0	2%	Nantucket	025	3	16	1	9%
Owensboro	423	-2	-6	-1	-4%	New Bedford	027	2	12	1	7%
Paducah	420	-2	2	-1	0%	Northfield	013	2	3	1	2%
Pikeville	415-416	-3	-14	-1	-8%	Pittsfield	012	1	0	0	1%
Somerset	425-426	0	-23	0	-11%	Springfield	011	-1	18	0	8%
White Plains	424	-3	-6	-1	-4%	Michigan Average					
Louisiana Average						Minnesota Average					
Alexandria	713-714	-3	-2	-1	-3%	Battle Creek	490-491	-3	1	-1	-1%
Baton Rouge	707-708	0	21	0	10%	Detroit	481-482	0	15	0	7%
Houma	703	-2	11	-1	4%	Flint	484-485	-3	-5	-1	-4%
Lafayette	705	0	3	0	1%	Grand Rapids	493-495	-2	4	-1	1%
Lake Charles	706	-2	15	-1	6%	Grayling	497	1	-17	0	-7%
Mandeville	704	0	-5	0	-2%	Jackson	492	-3	1	-1	-1%
Minden	710	-2	-8	-1	-5%	Lansing	488-489	0	1	0	0%
Monroe	712	-2	-14	-1	-8%	Marquette	498-499	-1	7	0	3%
New Orleans	700-701	0	5	0	2%	Pontiac	483	-3	30	-1	12%
Shreveport	711	-2	-6	-1	-4%	Royal Oak	480	-2	18	-1	7%
Maine Average						Mississippi Average					
Auburn	042	-1	-7	0	-4%	Clarksdale	386	-3	-16	-1	-9%
Augusta	043	-1	-9	0	-5%	Columbus	397	-1	1	0	0%
Bangor	044	-1	-11	0	-6%	Greenville	387	-4	-26	-1	-14%
Bath	045	1	-15	0	-6%	Greenwood	389	-3	-18	-1	-10%
Brunswick	039-040	1	-3	0	-1%	Gulfport	395	-2	-11	-1	-6%
Camden	048	-1	-21	0	-10%	Jackson	390-392	-3	-2	-1	-3%
Cutler	046	-1	-15	0	-7%	Laurel	394	-3	-11	-1	-7%
Dexter	049	-1	-8	0	-4%	Missouri Average					
Northern Area	047	-2	-16	-1	-8%	North Carolina Average					
Portland	041	2	2	1	2%	North Dakota Average					
Maryland Average						Ohio Average					
Annapolis	214	3	13	1	8%	Oklahoma Average					
Baltimore	210-212	-1	16	0	7%	Oregon Average					
Bethesda	208-209	3	24	1	13%	Rhode Island Average					
Church Hill	216	2	-10	1	-4%	Tennessee Average					
Cumberland	215	-4	-12	-1	-8%	Texas Average					
Elkton	219	2	-14	1	-5%	Utah Average					
Frederick	217	1	13	0	7%	Virginia Average					
Laurel	206-207	2	15	1	8%	Washington Average					
Salisbury	218	1	-14	0	-6%	West Virginia Average					

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
McComb	396	-2	-22	-1	-11%	New Hampshire Average		1	-4	0	-1%
Meridian	393	-2	8	-1	3%	Charlestown	036	1	-11	0	-5%
Tupelo	388	-1	-13	0	-7%	Concord	034	1	-7	0	-3%
Missouri Average		-1	-6	-1	-3%	Dover	038	1	1	0	1%
Cape Girardeau	637	-2	-8	-1	-5%	Lebanon	037	2	-8	1	-3%
Caruthersville	638	-1	-15	0	-7%	Littleton	035	-1	-12	0	-6%
Chillicothe	646	-2	-7	-1	-4%	Manchester	032-033	0	4	0	2%
Columbia	652	1	-9	0	-4%	New Boston	030-031	1	5	0	3%
East Lynne	647	-1	8	0	3%	New Jersey Average		1	20	0	9%
Farmington	636	-3	-15	-1	-8%	Atlantic City	080-084	-2	12	-1	4%
Hannibal	634	0	-4	0	-2%	Brick	087	2	2	1	2%
Independence	640	-2	13	-1	5%	Dover	078	1	19	0	9%
Jefferson City	650-651	1	-11	0	-5%	Edison	088-089	1	28	0	13%
Joplin	648	-2	-10	-1	-6%	Hackensack	076	3	18	1	10%
Kansas City	641	-2	15	-1	6%	Monmouth	077	3	22	1	12%
Kirksville	635	0	-33	0	-15%	Newark	071-073	1	23	0	11%
Knob Noster	653	0	4	0	2%	Passaic	070	2	23	1	12%
Lebanon	654-655	-2	-23	-1	-12%	Paterson	074-075	2	13	1	7%
Poplar Bluff	639	-1	-21	0	-10%	Princeton	085	-2	24	-1	10%
Saint Charles	633	1	2	0	1%	Summit	079	3	32	1	16%
Saint Joseph	644-645	-3	2	-1	-1%	Trenton	086	-3	19	-1	7%
Springfield	656-658	-2	-15	-1	-8%	New Mexico Average		0	-17	0	-8%
St Louis	630-631	-2	20	-1	8%	Alamogordo	883	-1	-22	0	-11%
Montana Average		0	-7	0	-3%	Albuquerque	870-871	2	-8	1	-3%
Billings	590-591	0	-4	0	-2%	Clovis	881	-2	-22	-1	-11%
Butte	597	1	-7	0	-3%	Farmington	874	2	-4	1	-1%
Fairview	592	-1	26	0	11%	Fort Sumner	882	-3	0	-1	-2%
Great Falls	594	-1	-11	0	-6%	Gallup	873	1	-17	0	-7%
Havre	595	-1	-19	0	-9%	Holman	877	2	-24	1	-10%
Helena	596	0	-4	0	-2%	Las Cruces	880	-1	-17	0	-8%
Kalispell	599	1	-15	0	-6%	Santa Fe	875	3	-20	1	-8%
Miles City	593	-1	-15	0	-7%	Socorro	878	1	-32	0	-14%
Missoula	598	1	-14	0	-6%	Truth or Consequences	879	-2	-15	-1	-8%
Nebraska Average		-1	-17	0	-8%	Tucumcari	884	-1	-17	0	-8%
Alliance	693	-1	-21	0	-10%	New York Average		0	13	0	6%
Columbus	686	0	-15	0	-7%	Albany	120-123	0	16	0	7%
Grand Island	688	0	-18	0	-8%	Amityville	117	2	18	1	9%
Hastings	689	0	-20	0	-9%	Batavia	140	-3	5	-1	1%
Lincoln	683-685	0	-9	0	-4%	Binghamton	137-139	-3	0	-1	-2%
McCook	690	1	-21	0	-9%	Bronx	104	2	19	1	10%
Norfolk	687	-3	-19	-1	-10%	Brooklyn	112	3	12	1	7%
North Platte	691	0	-14	0	-6%	Buffalo	142	-4	7	-1	1%
Omaha	680-681	-1	1	0	0%	Elmira	149	-4	-1	-1	-3%
Valentine	692	-2	-31	-1	-15%	Flushing	113	3	32	1	16%
Nevada Average		2	1	1	1%	Garden City	115	3	29	1	15%
Carson City	897	2	-12	1	-4%	Hicksville	118	3	27	1	14%
Elko	898	1	26	0	12%	Ithaca	148	-4	-6	-1	-5%
Ely	893	2	-8	1	-3%	Jamaica	114	3	30	1	15%
Fallon	894	2	-2	1	0%	Jamestown	147	-4	-11	-1	-7%
Las Vegas	889-891	2	5	1	3%	Kingston	124	0	-8	0	-4%
Reno	895	2	-4	1	-1%	Long Island	111	3	62	1	30%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Montauk	119	1	15	0	7%	Lima	458	-3	-8	-1	-5%
New York (Manhattan)	100-102	3	64	1	31%	Marietta	457	-2	-8	-1	-5%
New York City	100-102	3	64	1	31%	Marion	433	-3	-9	-1	-6%
Newcomb	128	-1	2	0	0%	Newark	430-431	-1	8	0	3%
Niagara Falls	143	-4	-8	-1	-6%	Sandusky	448-449	-1	-5	0	-3%
Plattsburgh	129	1	-3	0	-1%	Steubenville	439	-3	6	-1	1%
Poughkeepsie	125-126	1	2	0	1%	Toledo	434-436	-1	16	0	7%
Queens	110	4	35	1	18%	Warren	444	-4	-6	-1	-5%
Rochester	144-146	-3	8	-1	2%	Youngstown	445	-5	-1	-2	-3%
Rockaway	116	3	20	1	11%	Zanesville	437-438	-2	0	-1	-1%
Rome	133-134	-3	-6	-1	-4%	Oklahoma Average		-3	-7	-1	-5%
Staten Island	103	3	15	1	8%	Adams	739	-2	-20	-1	-10%
Stewart	127	-1	-9	0	-5%	Ardmore	734	-3	1	-1	-1%
Syracuse	130-132	-3	7	-1	2%	Clinton	736	-3	-2	-1	-3%
Tonawanda	141	-4	2	-1	-1%	Durant	747	-4	-20	-1	-11%
Utica	135	-4	-8	-1	-6%	Enid	737	-4	-4	-1	-4%
Watertown	136	-2	0	-1	-1%	Lawton	735	-3	-15	-1	-8%
West Point	109	1	11	0	6%	McAlester	745	-4	-10	-1	-7%
White Plains	105-108	3	28	1	14%	Muskogee	744	-2	-16	-1	-8%
North Carolina Average		1	-9	0	-4%	Norman	730	-2	-6	-1	-4%
Asheville	287-289	1	-16	0	-7%	Oklahoma City	731	-2	-4	-1	-3%
Charlotte	280-282	1	15	0	7%	Ponca City	746	-3	1	-1	-1%
Durham	277	2	-3	1	0%	Poteau	749	-2	-13	-1	-7%
Elizabeth City	279	1	-18	0	-8%	Pryor	743	-2	-11	-1	-6%
Fayetteville	283	-1	-12	0	-6%	Shawnee	748	-4	-13	-1	-8%
Goldsboro	275	1	-2	0	0%	Tulsa	740-741	-1	0	0	-1%
Greensboro	274	1	-7	0	-3%	Woodward	738	-4	15	-1	5%
Hickory	286	-1	-17	0	-8%	Oregon Average		1	-9	1	-3%
Kinston	285	-1	-19	0	-9%	Adrian	979	-1	-24	0	-12%
Raleigh	276	3	2	1	3%	Bend	977	1	-11	0	-5%
Rocky Mount	278	-1	-14	0	-7%	Eugene	974	2	-9	1	-3%
Wilmington	284	1	-14	0	-6%	Grants Pass	975	2	-13	1	-5%
Winston-Salem	270-273	0	-10	0	-5%	Klamath Falls	976	2	-19	1	-8%
North Dakota Average		-1	10	0	4%	Pendleton	978	0	-7	0	-3%
Bismarck	585	0	6	0	3%	Portland	970-972	2	19	1	10%
Dickinson	586	-1	34	0	15%	Salem	973	2	-7	1	-2%
Fargo	580-581	0	1	0	0%	Pennsylvania Average		-3	0	-1	-1%
Grand Forks	582	0	-3	0	-1%	Allentown	181	-2	8	-1	3%
Jamestown	584	-1	-7	0	-4%	Altoona	166	-3	-14	-1	-8%
Minot	587	-1	21	0	9%	Beaver Springs	178	-3	-8	-1	-5%
Nekoma	583	-1	-20	0	-10%	Bethlehem	180	-1	10	0	4%
Williston	588	-1	47	0	21%	Bradford	167	-4	-13	-1	-8%
Ohio Average		-2	2	-1	0%	Butler	160	-4	1	-1	-2%
Akron	442-443	-2	4	-1	1%	Chambersburg	172	-1	-13	0	-7%
Canton	446-447	-2	-3	-1	-2%	Clearfield	168	2	-8	1	-3%
Chillicothe	456	-2	-3	-1	-2%	DuBois	158	-2	-19	-1	-10%
Cincinnati	450-452	-1	7	0	3%	East Stroudsburg	183	0	-11	0	-5%
Cleveland	440-441	-3	11	-1	3%	Erie	164-165	-3	-10	-1	-6%
Columbus	432	0	11	0	5%	Genesee	169	-4	-5	-1	-4%
Dayton	453-455	-3	6	-1	1%	Greensburg	156	-4	-5	-1	-4%
						Harrisburg	170-171	-2	8	-1	3%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Hazleton	182	-3	-3	-1	-3%	Sioux Falls	570-571	0	-2	0	-1%
Johnstown	159	-4	-16	-1	-9%	Watertown	572	-1	-7	0	-4%
Kittanning	162	-4	-9	-1	-6%	Tennessee Average		0	-5	0	-2%
Lancaster	175-176	-2	1	-1	-1%	Chattanooga	374	-1	5	0	2%
Meadville	163	-4	-16	-1	-9%	Clarksville	370	1	2	0	1%
Montrose	188	-3	-6	-1	-4%	Cleveland	373	-1	-1	0	-1%
New Castle	161	-4	-1	-1	-3%	Columbia	384	-1	-14	0	-7%
Philadelphia	190-191	-3	27	-1	11%	Cookeville	385	0	-18	0	-8%
Pittsburgh	152	-4	17	-1	6%	Jackson	383	-1	-3	0	-2%
Pottsville	179	-4	-12	-1	-8%	Kingsport	376	0	-11	0	-5%
Punxsutawney	157	-4	-1	-1	-3%	Knoxville	377-379	-1	-3	0	-2%
Reading	195-196	-4	9	-1	2%	McKenzie	382	-1	-16	0	-8%
Scranton	184-185	-2	4	-1	1%	Memphis	380-381	-1	3	0	1%
Somerset	155	-4	-16	-1	-9%	Nashville	371-372	1	4	0	2%
Southeastern	193	0	19	0	9%	Texas Average		-2	4	-1	1%
Uniontown	154	-4	-9	-1	-6%	Abilene	795-796	-4	0	-1	-2%
Valley Forge	194	-3	27	-1	11%	Amarillo	790-791	-2	-2	-1	-2%
Warminster	189	-1	24	0	11%	Arlington	760	-1	4	0	1%
Warrendale	150-151	-4	16	-1	5%	Austin	786-787	1	9	0	5%
Washington	153	-4	23	-1	8%	Bay City	774	-1	61	0	28%
Wilkes Barre	186-187	-3	2	-1	-1%	Beaumont	776-777	-3	18	-1	7%
Williamspport	177	-3	-1	-1	-2%	Brownwood	768	-3	-14	-1	-8%
York	173-174	-3	2	-1	-1%	Bryan	778	0	-7	0	-3%
Rhode Island Average		1	10	0	5%	Childress	792	-3	-28	-1	-14%
Bristol	028	1	9	0	5%	Corpus Christi	783-784	-2	16	-1	6%
Coventry	028	1	9	0	5%	Dallas	751-753	-1	15	0	6%
Cranston	029	1	12	0	6%	Del Rio	788	-3	2	-1	-1%
Davisville	028	1	9	0	5%	El Paso	798-799	-3	-12	-1	-7%
Narragansett	028	1	9	0	5%	Fort Worth	761-762	-2	5	-1	1%
Newport	028	1	9	0	5%	Galveston	775	-3	30	-1	12%
Providence	029	1	12	0	6%	Giddings	789	0	-2	0	-1%
Warwick	028	1	9	0	5%	Greenville	754	-3	9	-1	3%
South Carolina Average		-1	-3	0	-2%	Houston	770-772	-1	33	0	15%
Aiken	298	0	9	0	4%	Huntsville	773	-2	34	-1	15%
Beaufort	299	-1	-4	0	-2%	Longview	756	-3	4	-1	0%
Charleston	294	-1	0	0	-1%	Lubbock	793-794	-3	-11	-1	-7%
Columbia	290-292	0	-4	0	-2%	Lufkin	759	-3	-5	-1	-4%
Greenville	296	0	8	0	4%	McAllen	785	-3	-24	-1	-13%
Myrtle Beach	295	0	-17	0	-8%	Midland	797	-3	25	-1	10%
Rock Hill	297	-1	-11	0	-6%	Palestine	758	-2	4	-1	1%
Spartanburg	293	-1	-6	0	-3%	Plano	750	0	15	0	7%
South Dakota Average		-1	-12	0	-6%	San Angelo	769	-3	-9	-1	-6%
Aberdeen	574	-1	-15	0	-7%	San Antonio	780-782	-3	4	-1	0%
Mitchell	573	-1	-11	0	-6%	Texarkana	755	-3	-15	-1	-8%
Mobridge	576	-2	-18	-1	-9%	Tyler	757	-1	-15	0	-7%
Pierre	575	-2	-20	-1	-10%	Victoria	779	-3	4	-1	0%
Rapid City	577	-2	-14	-1	-8%	Waco	765-767	-3	-2	-1	-3%
						Wichita Falls	763	-3	-16	-1	-9%
						Woodson	764	-3	-3	-1	-3%

Area Modification Factors

Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.	Location	Zip	Mat.	Lab.	Equip.	Total Wtd. Avg.
Utah Average		1	-9	1	-3%	Wenatchee	988	1	-14	0	-6%
Clearfield	840	2	-3	1	0%	Yakima	989	0	-10	0	-5%
Green River	845	1	-7	0	-3%	West Virginia Average		-2	-8	-1	-5%
Ogden	843-844	0	-19	0	-9%	Beckley	258-259	1	-11	0	-5%
Provo	846-847	2	-16	1	-6%	Bluefield	247-248	-1	2	0	0%
Salt Lake City	841	2	-1	1	1%	Charleston	250-253	1	8	0	4%
Vermont Average		1	-11	0	-5%	Clarksville	263-264	-3	-11	-1	-7%
Albany	058	1	-16	0	-7%	Fairmont	266	0	-24	0	-11%
Battleboro	053	1	-9	0	-4%	Huntington	255-257	-1	-7	0	-4%
Beecher Falls	059	1	-19	0	-8%	Lewisburg	249	-2	-29	-1	-14%
Bennington	052	0	-12	0	-6%	Martinsburg	254	-1	-10	0	-5%
Burlington	054	2	5	1	3%	Morgantown	265	-3	-6	-1	-4%
Montpelier	056	2	-10	1	-4%	New Martinsville	262	-2	-18	-1	-9%
Rutland	057	-1	-13	0	-7%	Parkersburg	261	-3	5	-1	1%
Springfield	051	-1	-11	0	-6%	Romney	267	-4	-10	-1	-7%
White River Junction	050	1	-12	0	-5%	Sugar Grove	268	-3	-14	-1	-8%
Virginia Average		0	-9	0	-4%	Wheeling	260	-3	14	-1	5%
Abingdon	242	-2	-18	-1	-9%	Wisconsin Average		-1	1	0	0%
Alexandria	220-223	3	18	1	10%	Amery	540	0	-3	0	-1%
Charlottesville	229	1	-15	0	-6%	Beloit	535	0	10	0	5%
Chesapeake	233	0	-8	0	-4%	Clam Lake	545	-1	-17	0	-8%
Culpeper	227	2	-12	1	-4%	Eau Claire	547	-1	-4	0	-2%
Farmville	239	-2	-24	-1	-12%	Green Bay	541-543	0	6	0	3%
Fredericksburg	224-225	1	-11	0	-5%	La Crosse	546	-2	3	-1	0%
Galax	243	-2	-20	-1	-10%	Ladysmith	548	-2	-1	-1	-2%
Harrisonburg	228	1	-14	0	-6%	Madison	537	2	14	1	8%
Lynchburg	245	-2	-17	-1	-9%	Milwaukee	530-534	0	12	0	6%
Norfolk	235-237	0	-4	0	-2%	Oshkosh	549	-1	9	0	4%
Petersburg	238	-2	-5	-1	-3%	Portage	539	0	0	0	0%
Radford	241	-1	-18	0	-9%	Prairie du Chien	538	-2	-12	-1	-7%
Reston	201	3	12	1	7%	Wausau	544	-1	-6	0	-3%
Richmond	232	-1	5	0	2%	Wyoming Average		0	-1	0	-1%
Roanoke	240	-1	-18	0	-9%	Casper	826	-2	4	-1	1%
Staunton	244	0	-15	0	-7%	Cheyenne/Laramie	820	1	-6	0	-2%
Tazewell	246	-3	-10	-1	-6%	Gillette	827	-1	7	0	3%
Virginia Beach	234	0	-6	0	-3%	Powell	824	0	-7	0	-3%
Williamsburg	230-231	0	-6	0	-3%	Rawlins	823	0	17	0	8%
Winchester	226	0	5	0	2%	Riverton	825	-1	-12	0	-6%
Washington Average		1	-2	1	0%	Rock Springs	829-831	0	2	0	1%
Clarkston	994	0	-18	0	-8%	Sheridan	828	1	-8	0	-3%
Everett	982	2	2	1	2%	Wheatland	822	0	-7	0	-3%
Olympia	985	2	-6	1	-2%	UNITED STATES TERRITORIES					
Pasco	993	0	2	0	1%	Guam	53	-21	-5	18%	
Seattle	980-981	3	21	1	11%	Puerto Rico	2	-47	-5	-21%	
Spokane	990-992	0	-7	0	-3%	VIRGIN ISLANDS (U.S.)					
Tacoma	983-984	2	3	1	2%	St. Croix	18	-15	-4	2%	
Vancouver	986	2	4	1	3%	St. John	52	-15	-4	20%	
						St. Thomas	23	-15	-4	5%	

Canadian Area Modification Factors

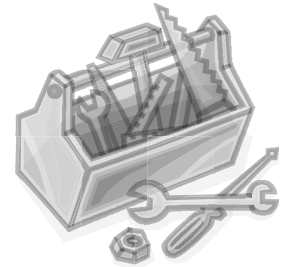
To find the cost in Canada in Canadian dollars, increase the costs in this book by the appropriate percentage listed below. These figures convert costs to Canadian dollars based on \$1.00 Canadian to \$0.76 U.S.

Location	Mat.	Lab.	Equip.	Total Wtd. Avg.
Alberta Average	26	-1	7	13%
Calgary	26	1	7	14%
Edmonton	25	2	7	14%
Fort McMurray	28	-7	7	12%
British Columbia Average	26	-15	7	7%
Fraser Valley	26	-16	7	6%
Okanagan	27	-18	7	6%
Vancouver	26	-11	7	9%
Manitoba Average	20	-22	5	0%
North Manitoba	20	-22	5	0%
Selkirk	20	-22	5	0%
South Manitoba	20	-22	5	0%
Winnipeg	20	-22	5	0%
New Brunswick	16	-47	3	-13%
Moncton	16	-47	3	-13%

Location	Mat.	Lab.	Equip.	Total Wtd. Avg.
Newfoundland/Labrador	19	-29	4	-3%
Nova Scotia Average	17	-36	4	-8%
Amherst	16	-36	3	-8%
Nova Scotia	17	-35	4	-7%
Sydney	17	-37	4	-8%
Ontario Average	22	-11	5	7%
London	22	-10	5	7%
Thunder Bay	24	-14	6	6%
Toronto	21	-9	5	7%
Quebec Average	19	-24	4	-1%
Montreal	19	-24	4	-1%
Quebec City	19	-24	4	-1%
Saskatchewan Average	23	-18	5	4%
La Ronge	24	-21	6	3%
Prince Albert	22	-20	5	2%
Saskatoon	22	-14	5	5%

Demolition

2



Nearly all home improvement projects require some breaking out and removing of existing materials and disposal of debris. Most will require protection of adjacent surfaces, taking safety precautions (such as setting up barricades), closing off doorways or windows, and normal cleanup. The demolition figures in this chapter include these tasks and will apply on most home improvement jobs that don't involve unusual conditions or complications. Costs will be higher when access to the work is limited, when your crew doesn't have complete control of the construction site, or when debris must be moved longer distances or around obstacles. All figures assume that debris is piled on site or in a bin. Add the cost of hauling to the nearest disposal site and tippage charges, if required. No salvage value is assumed except as noted.

Many of the following chapters include estimated costs to remove the old and replace with new materials of a similar description. For example, you'll find costs for removing shingles and replacing shingles in the roofing chapter. That's appropriate because they're part of the same task and usually performed by the same contractor. The estimates in this chapter are for demolition only and don't consider the cost of replacing what has been removed.

Of all construction tasks, demolition is probably the most difficult to estimate with any certainty. You're never sure what's in a wall to be demolished until the job begins. That's why it's best to exclude from your demolition bid what isn't in your estimate. Use the checklist to the right to help identify potential problems before they develop.

Demolition Checklist

- Can you anticipate any problem getting a demolition permit for this job?
- Is there a noise ordinance which will limit hours of operation or selection of equipment?
- Can the debris box be located close to the work?
- Can a trencher get to the job site?
- Is the site accessible to wheeled equipment?
- Will the debris have to be hand-carried to the roll-off box or gondola?
- Is there a direct route from the demolition site to the debris box?
- Will you need to re-route any plumbing, electrical, phone or gas lines?
- Will you need to remove and replace lawn sprinklers?
- Will you need to cut back or remove any bushes or trees?
- Will you have to remove and re-install a fence or gate?
- Does a septic tank or drain field extend into the site of construction?
- Can (must) materials generated from your project be recycled or salvaged?

	Day	Week	Month
Equipment Rental for Demolition.			
Air compressors, wheel-mounted			
16 CFM, shop type, electric	69.00	166.00	496.00
30 CFM, shop type, electric	76.00	227.00	683.00
80 CFM, shop type, electric	89.00	270.00	806.00
100 CFM, gasoline unit	110.00	331.00	931.00
125 CFM, gasoline unit	138.00	414.00	1,240.00
Paving breakers (no bits included) hand-held, pneumatic			
To 40 lb	42.00	116.00	294.00
41 - 55 lb	33.00	82.00	247.00
56 - 70 lb	63.00	137.00	368.00
71 - 90 lb	61.00	171.00	397.00
Paving breakers jackhammer bits			
Moil points, 15" to 18"	6.00	14.00	30.00
Chisels, 3"	7.00	17.00	44.00
Clay spades, 5-1/2"	10.00	23.00	62.00
Asphalt cutters, 5"	8.00	24.00	51.00
Pneumatic chippers, medium weight, 10 lb	30.00	90.00	250.00
Air hose rental, 50 LF section			
5/8" air hose	6.00	15.00	40.00
3/4" air hose	7.00	20.00	50.00
1" air hose	10.00	28.00	61.00
1-1/2" air hose	18.00	58.00	149.00
Dump truck rental rate plus mileage			
3 CY	329.00	900.00	1,820.00
5 CY	365.00	1,020.00	2,860.00
Hammer rental			
Electric brute breaker	61.00	250.00	750.00
Gas breaker	80.00	320.00	925.00
Demolition hammer, electric	55.00	216.00	635.00
Roto hammer, 7/8", electric	58.00	232.00	657.00
Roto hammer, 1-1/2", electric	60.00	206.00	589.00
Stump grinder, 9 HP	125.00	500.00	1,450.00
Brush chipper, trailer-mounted 40 HP	259.00	780.00	1,940.00
Chain saw, 18", gasoline	62.00	248.00	715.00
Chop saw, 14", electric	37.00	150.00	440.00
Backhoe/loader, wheel-mounted, diesel or gasoline			
1/2 CY bucket capacity, 55 HP	220.00	630.00	1,750.00
1 CY bucket capacity, 65 HP	255.00	940.00	2,800.00
1-1/4 CY bucket capacity, 75 HP	225.00	630.00	1,720.00
1-1/2 CY bucket capacity, 100 HP	320.00	1000.00	2,870.00
Wheel loader, front-end load and dump, diesel			
3/4 CY bucket, 4WD, articulated	255.00	1000.00	3,000.00
1 CY bucket, 4WD, articulated	235.00	820.00	2,250.00
2 CY bucket, 4WD, articulated	280.00	1,050.00	3,160.00

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Sitework Demolition						
Debris disposal and removal. Tipping charges for solid waste disposal at the dump vary from \$30 to \$120 per ton. For planning purposes, estimate waste disposal at \$75 per ton, plus the hauling cost. Call the dump or trash disposal company for actual charges. Typical costs are shown below.						
Dumpster, 3 CY trash bin, emptied weekly	—	Mo	—	—	330.00	—
Dumpster, 40 CY solid waste bin (lumber, drywall, roofing)						
Hauling cost, per load	—	Ea	—	—	230.00	—
Add to per load charge, per ton	—	Ton	—	—	55.00	—
Low-boy, 14 CY solid waste container (asphalt, dirt, masonry, concrete)						
Hauling cost, per load (7 CY maximum load)	—	Ea	—	—	230.00	—
Add to per load charge, per ton	—	Ton	—	—	55.00	—
Recycler fees. Recycling construction waste materials can substantially reduce disposal costs. Recycling charges vary from \$95 to \$120 per load, depending on the type of material and the size of the load. Add the cost of hauling to a recycling facility.						
Greenwaste	—	Ton	—	—	30.00	—
Asphalt, per load (7 CY)	—	Ea	—	—	100.00	—
Concrete, masonry or rock, per load (7 CY)	—	Ea	—	—	100.00	—
Dirt, per load (7 CY)	—	Ea	—	—	100.00	—
Mixed loads, per load (7 CY)	—	Ea	—	—	100.00	—
Bush and tree removal. Includes cutting into manageable pieces with power hand tools and dumping debris in a trash bin on site. Add the cost of power equipment rental, if needed.						
Shrubs and bushes, including stump removal.						
4' high, per each	BL@.750	Ea	—	22.40	22.40	38.10
Tree removal. Costs will vary widely depending on the condition, size, location and accessibility of the tree. Includes cutting into manageable pieces with power hand tools and dumping debris in a trash bin or chipper on site. Does not include stump removal or grinding. Add the cost of power equipment rental, bucket truck, and other specialized equipment if needed. Large shade tree removal may require a crew of 5 or more. Use \$2,000 as a minimum job charge for trees with a 36" diameter trunk and larger.						
8" to 12" diameter trunk	B8@2.50	Ea	—	89.70	89.70	152.00
13" to 18" diameter trunk	B8@3.50	Ea	—	126.00	126.00	214.00
19" to 24" diameter trunk	B8@5.50	Ea	—	197.00	197.00	335.00
25" to 36" diameter trunk	B8@7.00	Ea	—	251.00	251.00	427.00
Stump grinding, using a 9 HP wheel-mounted stump grinder						
6" to 10" diameter stump	B8@.800	Ea	—	28.70	28.70	48.80
11" to 14" diameter stump	B8@1.04	Ea	—	37.30	37.30	63.40
15" to 18" diameter stump	B8@1.30	Ea	—	46.60	46.60	79.20
19" to 24" diameter stump	B8@1.50	Ea	—	53.80	53.80	91.50
Fencing demolition. Remove chain link fence and cemented posts for disposal. These figures assume fencing is removed by cutting ties at posts and rails and rolling the fabric. These rolls can be heavy. A larger crew will be needed on larger jobs.						
To 6' high	BL@.100	LF	—	2.98	2.98	5.07
Remove chain link fence and cemented posts for salvage,						
To 6' high	BL@.120	LF	—	3.58	3.58	6.09
Remove board fence and cemented posts for disposal,						
To 6' high	BL@.100	LF	—	2.98	2.98	5.07

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Building Demolition						
Single-story room demolition. Includes breaking out a concrete or masonry foundation using pneumatic tools, breaking materials into manageable pieces with hand tools and handling debris to a trash bin on site. Includes the cost of erecting a temporary vapor barrier to seal the wall opening in the existing structure. Add the cost of wall patching on the remaining structure. Add the cost of equipment rental.						
Demolish a wood-frame addition built on a concrete slab, including grade beams. Use these figures to estimate the cost of demolishing an attached garage.						
Per square foot of floor area demolished	BL@.100	SF	—	2.98	2.98	5.07
Demolish a wood-frame addition built on a conventional foundation, including wood deck, stairs to grade, and the concrete or concrete block foundation.						
Per square foot of floor area demolished	BL@.120	SF	—	3.58	3.58	6.09
Detached garage demolition. Includes breaking materials into manageable pieces with hand tools and handling debris to a trash bin on site. No slab or foundation demolition included. No salvage of materials assumed.						
Frame garage with wood or aluminum siding						
One-car garage, to 10' wide by 22' deep	BL@16.5	Ea	—	492.00	492.00	836.00
Two-car garage, to 20' wide by 28' deep	BL@23.0	Ea	—	686.00	686.00	1,170.00
Frame garage with stucco siding						
One-car garage to 12' wide by 22' deep	BL@23.5	Ea	—	701.00	701.00	1,190.00
One-car to 16' wide by 22' deep	BL@28.5	Ea	—	850.00	850.00	1,450.00
Two-car garage to 22' wide by 28' deep	BL@42.5	Ea	—	1,270.00	1,270.00	2,160.00
Brick or block garage						
One-car garage to 12' wide by 22' deep	BL@23.0	Ea	—	686.00	686.00	1,170.00
One-car garage to 16' wide by 22' deep	BL@28.0	Ea	—	835.00	835.00	1,420.00
Two-car garage to 20' wide by 22' deep	BL@33.0	Ea	—	984.00	984.00	1,670.00
Cutting a building. Interior finish stripped back to the structural walls. Building structure to remain. No allowance for salvage value. These costs include loading and hauling up to 6 miles but no dump fees. Costs are per square foot of floor area based on 8' ceiling height. Add the cost of equipment rental. Figures in parentheses show the approximate "loose" volume of materials after demolition.						
Residential building (125 SF per CY)	BL@.100	SF	—	2.98	2.98	5.07
Building Component Demolition. Itemized costs for demolition of building components when building is being remodeled, repaired or rehabilitated and not completely demolished. Costs include protecting adjacent areas and normal clean-up. Costs are to break out the items listed and pile debris on site or in a bin.						
Brick wall demolition. Cost per square foot removed measured on one face. Removed using a pneumatic breaker. Add the cost of equipment rental. Figures in parentheses show the volume before and after demolition and weight of the materials after demolition.						
4" thick walls (60 SF per CY and 36 lbs. per SF)	BL@.061	SF	—	1.82	1.82	3.09
8" thick walls (30 SF per CY and 72 lbs. per SF)	BL@.110	SF	—	3.28	3.28	5.58

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Brick sidewalk demolition. Cost per square foot removed. Add the cost of Bobcat rental. Larger jobs will require a crew of 2 or more. Figures in parentheses show the volume before and after demolition and weight of materials after demolition.						
2-1/2" thick brick on sand base, no mortar bed, removed using hand tools (100 SF per CY and 28 lbs. per SF)	BL@.010	SF	—	.30	.30	.51
Brick pavers up to 4-1/2" thick with mortar bed, removed using a pneumatic breaker (55 SF per CY and 50 lbs. per SF)	BL@.050	SF	—	1.49	1.49	2.53

Concrete masonry wall demolition. Cost per square foot of wall removed measured on one side. Removed using a pneumatic breaker. Add the cost of equipment rental. Figures in parentheses show the volume before and after demolition and weight of materials after demolition.

4" thick walls (60 SF per CY and 19 lbs. per SF)	BL@.066	SF	—	1.97	1.97	3.35
6" thick walls (40 SF per CY and 28 lbs. per SF)	BL@.075	SF	—	2.24	2.24	3.81
8" thick walls (30 SF per CY and 34 lbs. per SF)	BL@.098	SF	—	2.92	2.92	4.96
12" thick walls (20 SF per CY and 46 lbs. per SF)	BL@.140	SF	—	4.17	4.17	7.09
Reinforced or grouted walls add	—	%	—	—	50.0	—

Concrete foundation demolition (footings). Steel reinforced, removed using a pneumatic breaker. Add the cost of equipment rental. Figures in parentheses show the volume before and after demolition.

Cost per CY (.75 CY per CY)	BL@3.96	CY	—	118.00	118.00	201.00
Cost per LF with width and depth as shown						
6" W x 12" D (35 LF per CY)	BL@.075	LF	—	2.24	2.24	3.81
8" W x 12" D (30 LF per CY)	BL@.098	LF	—	2.92	2.92	4.96
8" W x 16" D (20 LF per CY)	BL@.133	LF	—	3.97	3.97	6.75
8" W x 18" D (18 LF per CY)	BL@.147	LF	—	4.38	4.38	7.45
10" W x 12" D (21 LF per CY)	BL@.121	LF	—	3.61	3.61	6.14
10" W x 16" D (16 LF per CY)	BL@.165	LF	—	4.92	4.92	8.36
10" W x 18" D (14 LF per CY)	BL@.185	LF	—	5.52	5.52	9.38
12" W x 12" D (20 LF per CY)	BL@.147	LF	—	4.38	4.38	7.45
12" W x 16" D (13 LF per CY)	BL@.196	LF	—	5.84	5.84	9.93
12" W x 20" D (11 LF per CY)	BL@.245	LF	—	7.31	7.31	12.40
12" W x 24" D (9 LF per CY)	BL@.294	LF	—	8.77	8.77	14.90

Concrete sidewalk demolition. To 4" thick, cost per SF removed. Figures in parentheses show the volume before and after demolition.

Non-reinforced, removed by hand with sledge (60 SF per CY)	BL@.050	SF	—	1.49	1.49	2.53
Reinforced with wire mesh. Mesh cut into manageable pieces, then removed using pneumatic breaker. Add the cost of equipment rental. (55 SF per CY)	BL@.060	SF	—	1.79	1.79	3.04

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Porch and deck demolition. Includes breaking materials into manageable pieces with hand tools and handling debris to a trash bin on site.						
Demolish an enclosed wood-frame porch. Includes breaking out the concrete or masonry pier foundation. Per square foot of floor.						
One story	BL@.250	SF	—	7.46	7.46	12.70
Two story	BL@.225	SF	—	6.71	6.71	11.40
Three story	BL@.196	SF	—	5.84	5.84	9.93
Demolish a screened porch built on a concrete slab. Includes demolition of one concrete or wood frame step to grade. Per square foot of floor area.						
Porch and one step (no slab demolition)	BL@.100	SF	—	2.98	2.98	5.07
Demolish a wood deck with railing or kneewall. Includes demolition of the wood deck and up to 7 steps to grade.						
Deck to 150 SF	BL@18.5	Ea	—	552.00	552.00	938.00
Add per SF for deck over 150 SF	BL@.100	SF	—	2.98	2.98	5.07

Concrete slab demolition. Break up and remove concrete slab using a compressor and pneumatic hammer. Includes loosening concrete with a pick and handling debris to a trash bin on site. Costs for demolition of reinforced concrete slab include burning off rebars with an acetylene torch. Add the rental cost of a compressor, pneumatic hammer and a torch, as required. Figures in parentheses show the volume before and after demolition.

4" non-reinforced concrete (60 SF per CY)	BL@.057	SF	—	1.70	1.70	2.89
4" reinforced concrete (60 SF per CY)	BL@.071	SF	—	2.12	2.12	3.60
6" non-reinforced concrete (45 SF per CY)	BL@.083	SF	—	2.48	2.48	4.22
6" reinforced concrete (45 SF per CY)	BL@.103	SF	—	3.07	3.07	5.22
8" non-reinforced concrete (30 SF per CY)	BL@.109	SF	—	3.25	3.25	5.53
8" reinforced concrete (30 SF per CY)	BL@.122	SF	—	3.64	3.64	6.19

Asphalt pavement demolition. Asphaltic concrete (bituminous) 3" thick, removed using a pneumatic spade. Add the cost of equipment rental and dump fees. Figures in parentheses show the volume before and after demolition and weight of debris.

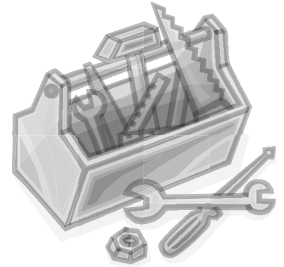
Break up and shovel on to a truck (4 SY per CY and 660 lbs. per SY)	BL@.140	SY	—	4.17	4.17	7.09
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Concrete wall demolition. Steel reinforced, removed using a compressor and pneumatic breaker. Add the cost of equipment rental. Figures in parentheses show the volume before and after demolition.

Cost per CY (1.33 CY per CY)	BL@4.76	CY	—	142.00	142.00	241.00
Cost per SF with thickness as shown						
3" wall thickness (80 SF per CY)	BL@.045	SF	—	1.34	1.34	2.28
4" wall thickness (55 SF per CY)	BL@.058	SF	—	1.73	1.73	2.94
5" wall thickness (45 SF per CY)	BL@.075	SF	—	2.24	2.24	3.81
6" wall thickness (40 SF per CY)	BL@.090	SF	—	2.68	2.68	4.56
8" wall thickness (30 SF per CY)	BL@.120	SF	—	3.58	3.58	6.09
10" wall thickness (25 SF per CY)	BL@.147	SF	—	4.38	4.38	7.45
12" wall thickness (20 SF per CY)	BL@.176	SF	—	5.25	5.25	8.93

Foundations and Slabs

3



Many older homes have foundations that have cracked or settled. Check the foundation wall for deterioration that could allow water to enter the basement. Check both foundation walls and piers for settling. Windows or door frames out of square or loosened interior wall finish suggest that the foundation has settled. The next chapter explains how to correct minor settling by jacking and re-leveling beams and floor joists. Individual piers can be replaced. But if the pier has stopped settling, jack the supported girder or joist and add a block to the top of the pier.

Most concrete foundation walls develop minor hairline cracks that have no effect on the structure. However, open cracks may indicate a failure of the foundation that's getting progressively worse. To find out if a crack is active or dormant, scratch a line at the end of the crack and wedge a nail tightly into the crack. If the crack grows beyond the scratch mark or if the nail can be removed easily several months later, the crack is probably active.

If a crack is dormant, it can be repaired by routing and sealing. Enlarge the crack with a concrete saw or by chipping with hand tools. The crack should be routed 1¹/₄" or more in width and about the same depth. Rinse the joint clean and let it dry. Then apply a joint sealer such as an epoxy-cement compound in accord with the manufacturer's instructions.

Active cracks require an elastic sealant. Again, follow the manufacturer's instructions. Good-quality concrete sealant will remain pliable for many years. The minimum routing depth and width for these sealants is ³/₄". The elastic material will deform but maintain a tight seal as the crack moves. You could also apply a strip sealant over the crack. But these protrude from the surface and make a poor choice if the wall is visible from the building exterior.

Repair loose mortar by brushing thoroughly to remove dust and loose particles. Before applying new mortar, dampen the clean surface so that it won't absorb water during repair. You can buy premixed mortar with the consistency of putty. Apply mortar over the cavity as if you were filling a void with painter's caulk. For a good bond, force mortar into the crack. Then smooth the surface with a trowel. Cover with a vapor barrier for a few days to keep the mortar from drying too fast.

Damp or leaky basement walls are usually caused by clogged drain tile, clogged or broken downspouts, cracks in walls, or by water that puddles against the foundation. Look for downspouts that empty against the foundation wall or surface drainage channeling by the foundation. For a dry basement, keep water away from the foundation by proper grading.

Foundation and Slab Pre-Construction Checklist

- Is the site accessible to wheeled equipment?
- Is the site accessible to a concrete truck?
- Will you need to re-route plumbing, electrical, gas or communication lines?
- Will you need to remove and replace lawn sprinklers?
- Will you need to cut back or remove bushes or trees?
- Will you have to remove and re-install a fence or gate?
- Does a septic tank or drain field extend into the site of construction?
- Can excess soil be spread on the premises?
- Will dirt need to be imported or exported for site balance?
- Will heavy equipment damage the roots of trees?
- Is a permit needed to move heavy equipment across city sidewalks?
- Do city sidewalks have to be planked?
- Will swales or culverts pose problems for equipment?
- Will a septic system, catch basins or wells have to be relocated?
- Will barricades and warning lights be needed?

A high water table is a more serious problem. A basement will never be completely dry if the water table extends above the basement floor. Heavy foundation waterproofing or footing drains may help, but they're unlikely to do more than minimize the problem.

	Day	Week	Month
Equipment Rental for Foundations and Slabs.			
Buggies, push type, 7 CF	67.00	397.00	693.00
Buggies, walking type, 12 CF	73.00	255.00	740.00
Buggies, riding type, 14 CF	83.00	300.00	810.00
Buggies, riding type, 18 CF	112.00	350.00	725.00
Vibrator, electric, 3 HP, flexible shaft	64.00	155.00	390.00
Vibrator, gasoline, 6 HP, flexible shaft	81.00	239.00	714.00
Troweling machine, 36", 4 paddle	78.00	205.00	570.00
Cement mixer, 6 CF	75.00	170.00	455.00
Towable mixer (10+ CF)	70.00	160.00	580.00
Power trowel 36", gas, with standard handle	78.00	205.00	570.00
Bull float	13.00	42.00	100.00
Concrete saws, gas powered, excluding blade cost			
10 HP, push type	48.00	160.00	470.00
20 HP, self propelled	160.00	375.00	980.00
37 HP, self propelled	240.00	550.00	1,530.00
Concrete conveyor, belt type, portable, gas powered, all sizes	135.00	495.00	1,330.00
Vibrating screed, 16', single beam	100.00	225.00	585.00
Column clamps, to 48", per set	—	—	6.76
Skid steer loaders			
Bobcat 643, 1,000-lb. capacity	250.00	850.00	1,840.00
Bobcat 753, 1,350-lb. capacity	250.00	830.00	1,850.00
Bobcat 763, 1,750-lb. capacity	250.00	770.00	1,800.00
Bobcat 863, 1,900-lb. capacity	330.00	1,050.00	2,450.00
Skid steer attachments			
Auger	75.00	235.00	660.00
Hydraulic breaker	170.00	540.00	1,570.00
Backhoe	100.00	330.00	1,060.00
Sweeper	155.00	295.00	1,020.00
Grapple bucket	55.00	160.00	470.00
Trenchers, inclined chain boom type, pneumatic tired			
15 HP, 12" wide, 48" max. depth, walking	193.00	560.00	1,520.00
20 HP, 12" wide, 60" max. depth, riding	312.00	1,010.00	2,700.00
Wheel loaders, front-end load and dump, diesel			
3/4 CY bucket, 4WD, articulated	255.00	1,000.00	3,000.00
1 CY bucket, 4WD, articulated	235.00	820.00	2,250.00
2 CY bucket, 4WD, articulated	280.00	1,050.00	3,160.00
Vibro plate, 300 lb, 24" plate width, gas	92.00	305.00	891.00
Vibro plate, 600 lb, 32" plate width, gas	225.00	600.00	1,500.00
Rammer, 60 CPM, 200 lb, gas powered	85.00	220.00	570.00

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Concrete pumping. Using a trailer-mounted gasoline pump.						
3/8" aggregate mix (pea gravel), using hose to 200'						
Cost per cubic yard (pumping only)	—	CY	—	—	16.00	—
Add for hose over 200', per LF	—	LF	—	—	2.00	—
3/4" aggregate mix, using hose to 200'						
Cost per cubic yard (pumping only)	—	CY	—	—	16.50	—
Add for hose over 200', per LF	—	LF	—	—	2.00	—

Modified bitumen membrane roofing comes in 100-square-foot rolls. Use one, two, or three plies to create a finished roof. Or combine modified bitumen membrane with fiberglass felt to form a hybrid roof system.

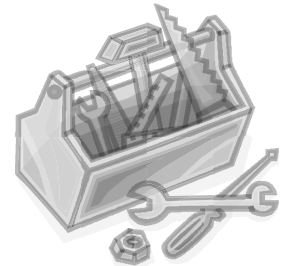
The minimum roof slope should be not less than $\frac{1}{4}$ " of rise per 12" of horizontal run. The surface can be finished with mineral granules or an aggregate, such as gravel or slag.

How to Measure Roof Area

Flat roofs are easy to measure. Just divide the area into rectangles, calculate the area of each, and add up the total. You can probably do that from the ground. Sloping roofs are a little more complex. The steeper the slope, the more the roof area differs from the horizontal (plane) area. To calculate the roof surface accurately, you have to multiply the rafter lengths by the width of each pitch. However, if the roof pitch is no more than 5 in 12, a simple rule of thumb will yield nearly the same result in a fraction of the time: Multiply the length and width of the building, including eaves and overhang. Divide by 100 to find the number of roofing "squares." Then add 10 percent for a gable roof, 15 percent for a hip roof and 20 percent for a roof with dormers.

Porches and Decks

16



Adding a porch or a deck is a popular home improvement project. The advantage is obvious: Porches and decks add value at a lesser square foot cost than similar enclosed living area. What isn't so obvious is the disadvantage: Porches and decks are more exposed to the weather, and have a life expectancy considerably less than the home itself. That makes porch and deck work a common repair task. The result is a steady volume of work for porch and deck specialists. This chapter includes cost estimates for both the addition of new porches and decks, and repair work.

Inspecting for Decay

Exposure to sun, wind and rain tends to open wood grain. The result is a higher moisture content that supports the growth of wood-destroying organisms. Nearly all wood decays if it remains moist for long periods. Check for decay and insect damage with a screwdriver. Wood has lost nearly all its load-carrying capacity when you can push a common screwdriver blade into the grain. Deck flooring needs to be replaced when it sags under foot traffic.

Check the crawlspace under the porch or deck for signs of dampness. Condensation forms on the underside of an elevated porch or deck when there isn't proper ventilation. Replace decayed framing with treated lumber.

Give particular attention to posts that are in contact with concrete. Posts should be replaced when heavily decayed. Support the new post slightly above the porch floor with a post anchor, as in Figure 16-1. Embed the post anchor in concrete to help protect the porch roof from uplift wind forces.

If a decayed post is strictly ornamental, consider cutting off the decayed base. Replace the decayed portion with a wood block secured to the concrete with a pin and a washer. Add base trim to conceal the patch (see Figure 16-2). Keep trim pieces slightly above the concrete so moisture can escape.

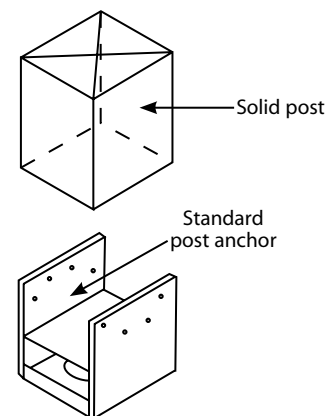


Figure 16-1

Base for post; standard post anchor for resistance to uplift

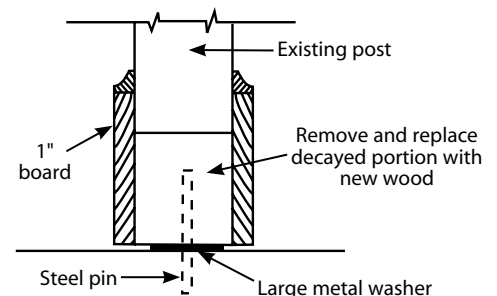


Figure 16-2

Replace end of decayed porch post

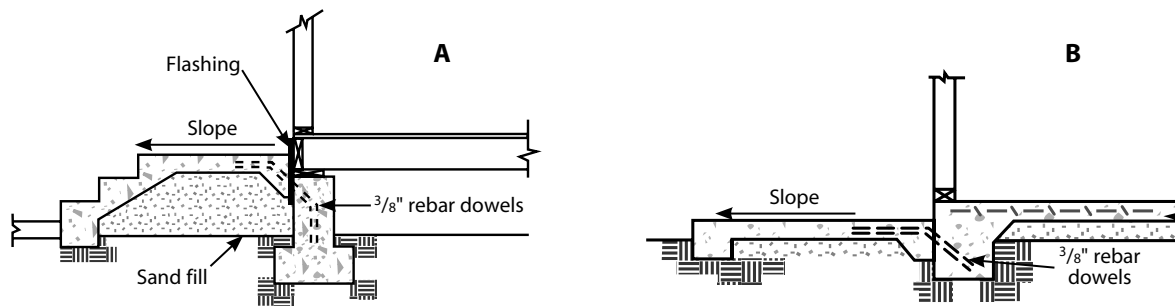


Figure 16-3

Porch slab connection to house: **A**, concrete porch with wood-frame floor; **B**, porch with house slab

Adding a Porch

Figure 16-3 shows how to tie a porch slab to a house with either a conventional crawlspace foundation (Figure 16-3A) or a concrete slab (Figure 16-3B). Tie the new concrete foundation, piers or slab to the existing foundation with anchor bolts. The new footing should go at least as deep as the footing on the existing building.

Figure 16-4 shows construction details for a porch addition built on a concrete slab. In colder climates and where the porch or deck can be built at least 18" above ground level, use conventional floor framing, as shown in Figure 16-5. Provide a polyethylene soil cover to control excessive moisture. Whether wood or concrete, slope the floor away from the house at least 1/8" per foot of width. That'll help keep water away from the existing foundation line.

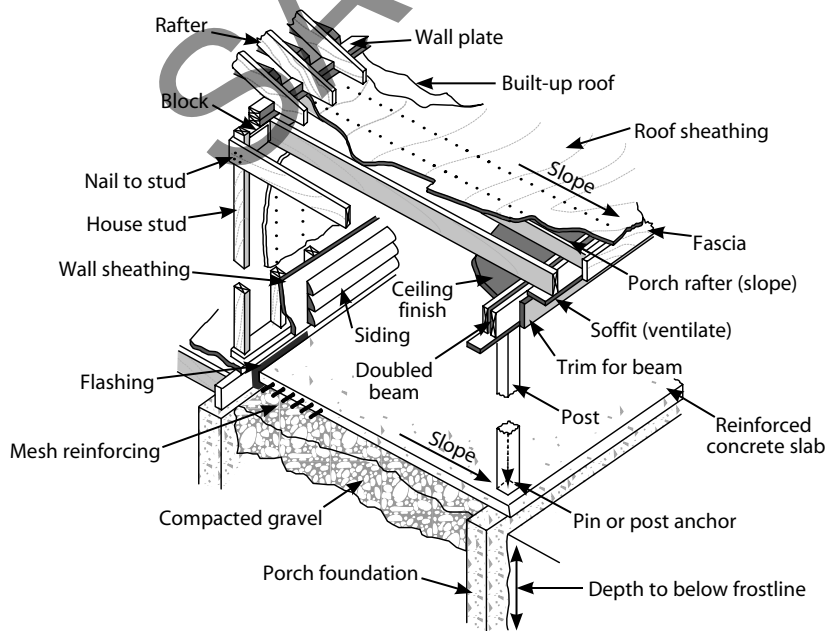
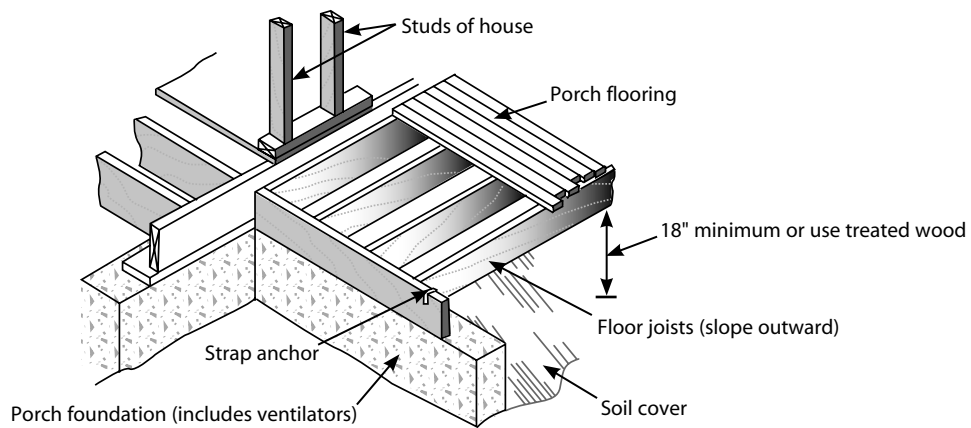


Figure 16-4

Details of porch construction for concrete slab

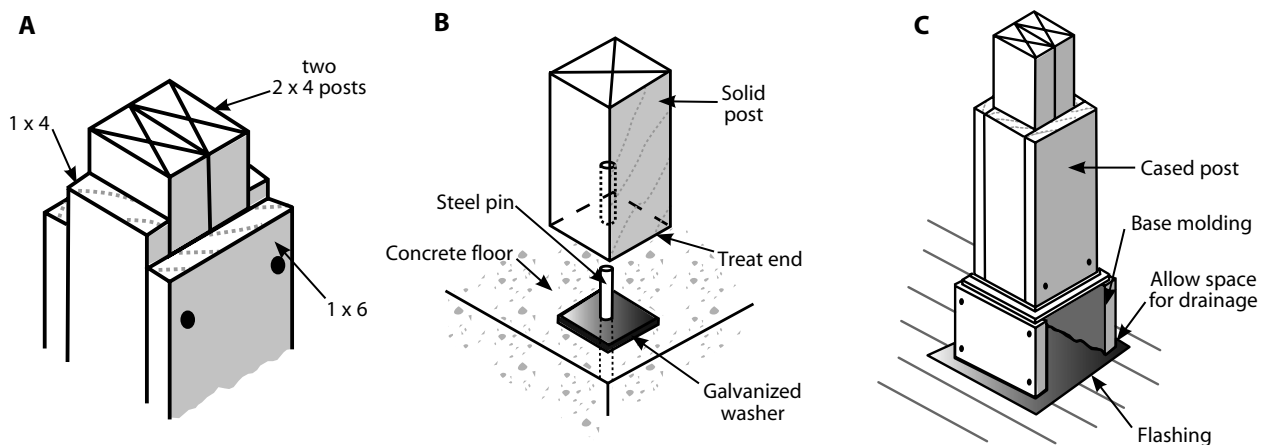
**Figure 16-5**

Porch floor with wood framing

Columns and Posts

Support the porch roof with either solid or built-up posts or columns. Figure 16-6A shows a column built from doubled 2 x 4s covered with 1 x 4" casing on two opposite sides and 1 x 6" finish casing on the other sides. Solid posts should be either 4 x 4" or 6 x 6" lumber. For a traditional-style home, use factory-made adjustable round columns.

Keep the post or column base out of any pocket or depression that will collect moisture and invite decay. If high winds aren't a design consideration, use a steel pin to join a one-piece post to the foundation. Set a large galvanized washer or spacer between the bottom of the post and the top of the floor or slab, as in Figure 16-6B. Apply wood preservative to cut ends at both the top and bottom of the post. For a cased post, install flashing under the base molding, as in Figure 16-6C. Build all deck posts and framing from pressure-treated lumber. Use 0.40 treated lumber for framing and 0.60 treated lumber for posts in contact with the ground.

**Figure 16-6**

Post details: A, cased post; B, pin anchor and space; C, flashing at base

Balustrades

To exclude insects and flying debris, enclose the porch with either combination windows or window screen. See Figure 16-7A. An open balustrade adds safety as well as a decorative accent to a porch that isn't enclosed. See Figure 16-7B.

All wood railing exposed to weather should be shaped to shed water. Select railing that tapers slightly at the edges. Figure 16-8A shows a balustrade with a tapered top rail, a tapered bottom rail and balusters connecting the two. Design the joint between the post and rail to avoid trapping moisture. One method is to leave a small space between the post and the end of the railing, as shown in Figure 16-8B. Treat the cut rail end with water-repellent preservative. Wood posts, balusters and railings should be made from either the heartwood of a decay-resistant wood species or from treated wood. Place a small block under the bottom railing so it doesn't contact a concrete floor. Any wood in contact with concrete should be pressure-treated.

You must provide a railing around the perimeter of the porch if it's more than 30" above the existing grade. Generally the railing on a single-family residential porch or deck must be at least 36" high. Secure all hand rails and guard rails firmly to the deck. The space between balusters must be narrow enough so that nothing larger than a 4"-diameter sphere can pass through it.

Elevated Decks

An elevated wood deck is a good choice for a sloping lot where a concrete patio slab isn't practical. Use pressure-treated or decay-resistant lumber for support posts, beams and joists. Joist spacing can be 24", 16" or 12" on center, depending on the anticipated load and the type of deck material you use. The deck surface can be either wood that's naturally decay-resistant, pressure-treated, or a composite

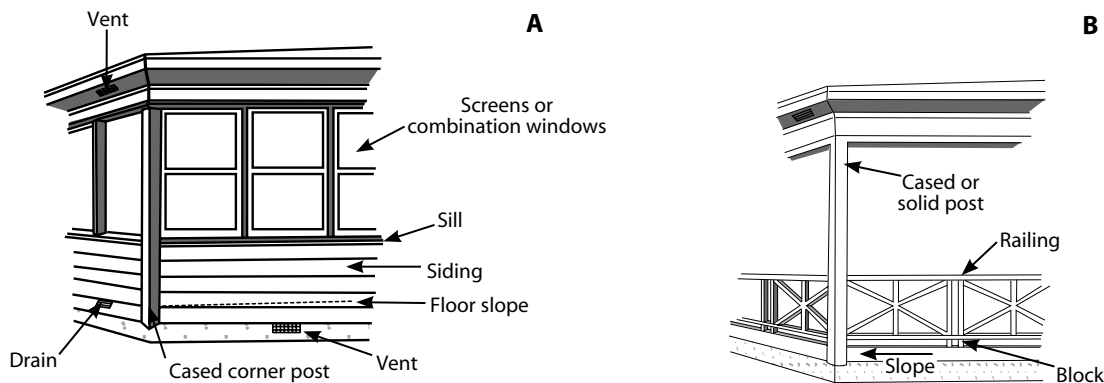
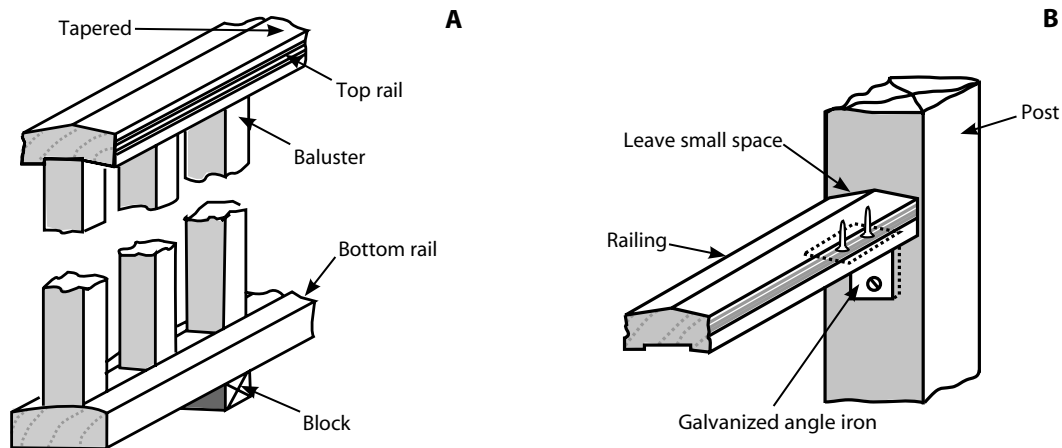


Figure 16-7

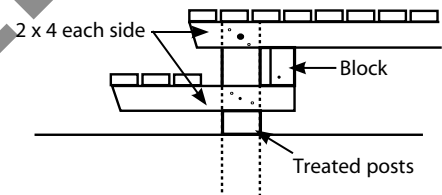
Types of balustrades: **A**, closed balustrades; **B**, open balustrades

**Figure 16-8**

Railing details: **A**, balustrade assembly; **B**, rail to post connection

made from recycled plastics. Synthetic decking doesn't have the strength of wood decking and usually requires joists spaced 12" on center.

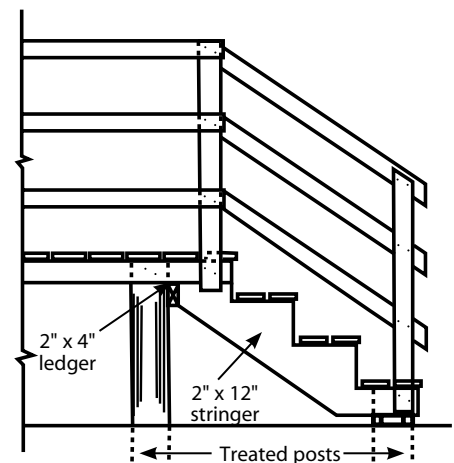
The bottom step of an elevated porch or deck stairway should never be in contact with the soil. Support the bottom step and stair carriage on a concrete pad or with a pressure-treated post. Figure 16-9 shows a porch stairway supported on treated posts. Posts like this should measure at least 5" in each dimension and should be embedded in the soil at least 3'. Nail and bolt a cross member between the posts. Then block the inner end of the horizontal support to the floor framing.

**Figure 16-9**

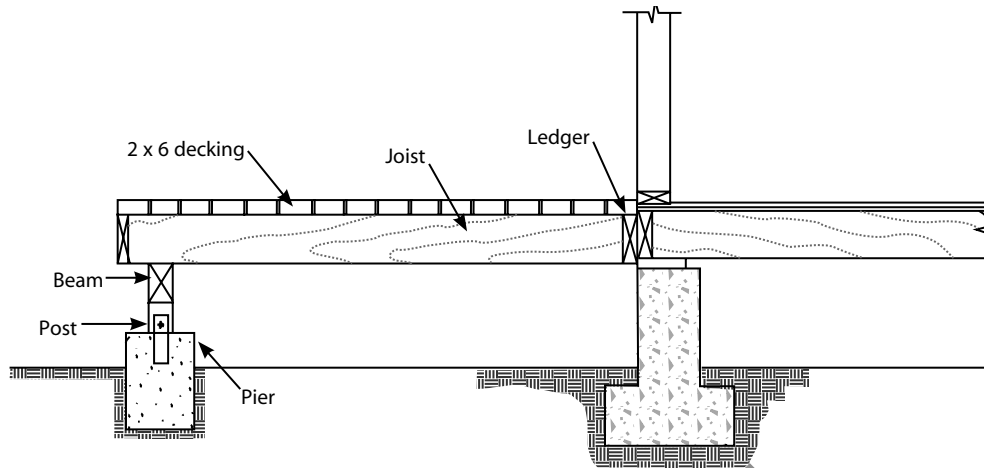
Single porch step supported on a treated post

Where more than one step is required, use a 2 x 12 stringer at each end of the steps (see Figure 16-10). Bolt the lower end of each stringer to a treated post and attach the upper end of the stringer to the porch framing. You could also support the stairway on concrete or masonry piers.

Begin the construction of an elevated porch and deck by fastening a ledger securely to the existing sill with lag bolts (Figure 16-11). Then build a post and beam framework that'll support the joists and wood decking. Hang joists from the ledger using metal joist hangers. Joist spacing depends of the type of decking you select. As mentioned earlier, synthetic deck materials usually require joists no more than 12" on center. For treated 5/4" fir and pine, you can usually space joists 16" on center. Install solid blocking between the joists at all supporting beams. Finally, fasten decking to the joists. You can face-nail, blind-nail or screw and plug wood decking in straight, diagonal, herringbone, or checkerboard patterns.

**Figure 16-10**

Step stringer supported by porch framing and posts

**Figure 16-11**

Wood deck attached to house

If you build or remodel a deck that is under a window, and the deck floor is less than 18" below the bottom edge of the window, that window may now be considered a hazardous location by the building code. If it is, the window must be special safety glass. Check for this when you estimate the job. That way if it applies, you can include the cost in your bid.

Choices in Porch and Deck Floor Plank

Western red cedar and redwood are naturally decay- and insect-resistant. The cost is higher than pressure-treated lumber, especially in areas remote from the west coast of the U.S. and Canada, where western red cedar and redwood are milled. For decks, use either construction common or construction heart redwood. "Merch" redwood is a lower grade ("merchantable") and has more knots and sapwood. Heart redwood is cinnamon-red and has more natural decay resistance. The sapwood is creamy yellow. The most common widths are 4" and 6". Lengths are usually 8', 12' and 16'. Both $\frac{5}{4}$ " and nominal 2" thickness are available. When left unfinished, both redwood and cedar turn a rustic gray after a few years. Apply water-repellent or stain to retard the color change. Varnishes and other film-forming coatings will crack and peel on a walking surface and aren't recommended. Both western red cedar and redwood are relatively soft and can be abraded under foot traffic.

Pressure-treated lumber makes sturdy and durable deck material. Most treated lumber sold for decking measures $\frac{5}{4}$ " ($1\frac{1}{4}$ ") or nominal 2" thick and from 4" to 6" wide. Lengths are from 8' to 16'. Shorter lengths and narrower widths cost less per square foot of deck. Longer and wider pieces cost more but require less labor for installation. Pressure-treated wood decking costs less than other decking materials but should be fastened with galvanized nails or screws. All hangers and fasteners should be hot-dipped galvanized, such as Simpson Zmax. For 2" lumber, use

12d nails or 3" screws. For $\frac{5}{4}$ " decking, use 10d nails or $2\frac{1}{2}$ " screws. Most pressure-treated lumber isn't pretty. It comes from the lumberyard tinted green from the residue of the ACQ (alkaline copper quaternary) or CA (copper azol) treatment. Soft areas in the wood absorb more stain than the harder portions. The result is a mottled appearance that won't win any prizes. Exposure to the sun and rain will fade the deck from green to honey to gray after a few years. Unless deck lumber has been coated already (Thompsonized), apply a water-repellent top coat immediately after installation.

All wood decks require occasional maintenance. Check for splits, warping, popped nails and splinters. Unless the owner likes the look of aged wood, he'll need to apply a coat of sealer every few years.

Synthetics include composites made from a combination of recycled wood fiber and recycled thermoplastics. These products (Fiberon is one name) look like real wood and have characteristics like real wood. For example, composites don't expand and contract as much as thermoplastics. But composites made from wood fiber will absorb moisture and tend to age like real wood. You can cut or drill composites with an ordinary hand drill or hand saw equipped with a carbide tip blade. Composites can be stained or painted and should never require maintenance. Deck planks made from rice hulls (Edeck[®]) are stronger than other composites and don't absorb moisture like deck lumber made from wood fiber. Edeck[®] requires installation with T-clips that permit expansion and contraction as the deck material heats and cools. Synthetics tend to be more slippery than real wood, especially when wet.

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Porch and deck demolition. Includes demolition of framing, supports, flooring, posts, railing, wood stairs. Enclosed porch demolition also includes removal of roof framing, interior finish, gutters, downspouts and roofing. These figures assume use of hand tools (rather than excavation equipment). All debris piled on site. No salvage value assumed. Add the cost of debris hauling and dump fees. Add the cost of electric work, patching of exterior walls and patching of the roof, if required. Cost per square foot of floor demolished.						
Demolish enclosed wood-frame porch						
One story	BL@.250	SF	—	7.46	7.46	12.70
Two story	BL@.225	SF	—	6.71	6.71	11.40
Three story	BL@.196	SF	—	5.84	5.84	9.93
Demolish a screened porch built on a concrete slab. Includes demolition of one concrete or wood frame step to grade. Per square foot of floor area.						
Porch and one step (no slab demolition)	BL@.100	SF	—	2.98	2.98	5.07
Demolish a wood deck with railing or kneewall. Includes demolition of the wood deck and up to 7 steps to grade.						
Deck to 150 SF	BL@18.5	Ea	—	552.00	552.00	938.00
Add per SF for deck over 150 SF	BL@.100	SF	—	2.98	2.98	5.07
Porch and deck repair. Includes piling debris on site. No salvage value assumed.						
Remove and replace structural deck posts						
8' treated post, to 6" x 6"	B1@10.3	Ea	18.80	343.00	361.80	615.00
8' x 10" wood colonial column	B1@11.0	Ea	130.00	366.00	496.00	843.00
Built-up 8' to 10' post	B1@10.0	Ea	14.80	333.00	347.80	591.00
Cut post base and patch 6" x 6" post	B1@5.50	Ea	18.70	183.00	201.70	343.00
Deck and stair repairs						
Chip out decay in joist, reinforce with 2" x 6" to 2" x 10" sister joist per LF of joist	B1@.333	LF	1.60	11.10	12.70	21.60
Remove wood porch or deck floor and replace with 5/4" or 2" wood flooring per SF of flooring	B1@.166	SF	2.60	5.53	8.13	13.80
Remove and replace wood exterior open stairs, per SF of tread and landing	B1@.725	SF	17.90	24.10	42.00	71.40
Post and beam wood deck. Using pressure treated framing lumber with 4" x 6" posts set in concrete. Includes concrete, pressure treated posts, beams, joists 12" on center, deck plank as described, galvanized hardware, fasteners, 4' wide stairs from deck level to ground level, 36" high railing with balusters 4" on center and stair rail. Add for deck skirt and deck finish, if needed. Per square foot of floor area.						
Based on rectangular 12' x 10' deck with railing on four sides and stairway, 24" above ground level.						
With 5/4" pressure treated plank	B1@.260	SF	10.32	8.66	18.98	32.30
With 2" Thompsonized plank	B1@.260	SF	10.50	8.66	19.16	32.60
With 5/4" western red cedar plank	B1@.260	SF	12.90	8.66	21.56	36.70
With 5/4" Fiberon deck plank	B1@.260	SF	15.60	8.66	24.26	41.20
With 5/4" Edeck® plank	B1@.260	SF	25.90	8.66	34.56	58.80
Based on L-shaped 12' x 12' deck with railing on three sides and stairway, 120" above ground level.						
With 5/4" pressure treated plank	B1@.330	SF	12.40	11.00	23.40	39.80
With 2" Thompsonized plank	B1@.330	SF	13.20	11.00	24.20	41.10
With 5/4" western red cedar plank	B1@.330	SF	16.20	11.00	27.20	46.20
With 5/4" Fiberon deck plank	B1@.330	SF	19.30	11.00	30.30	51.50
With 5/4" Edeck® plank	B1@.330	SF	30.00	11.00	41.00	69.70
Add for framing to support a spa	B1@8.50	LS	128.00	283.00	411.00	699.00
Add for split level deck, 6" difference	B1@6.00	Ea	134.00	200.00	334.00	568.00
Add for stain and sealer finish	B1@.006	SF	.13	.20	.33	.56
Pressure treated construction select deck framing lumber. For use above ground. .40 treatment. Nominal sizes.						
2" x 4" x 8'	—	Ea	9.86	—	9.86	—
2" x 4" x 10'	—	Ea	7.34	—	7.34	—
2" x 4" x 16'	—	Ea	12.30	—	12.30	—

	Craft@Hrs	Unit	Material	Labor	Total	Sell
2" x 6" x 8'	—	Ea	13.00	—	13.00	—
2" x 6" x 10'	—	Ea	11.30	—	11.30	—
2" x 6" x 16'	—	Ea	16.80	—	16.80	—
2" x 8" x 8'	—	Ea	14.90	—	14.90	—
2" x 8" x 10'	—	Ea	18.50	—	18.50	—
2" x 8" x 12'	—	Ea	21.40	—	21.40	—
2" x 8" x 16'	—	Ea	24.60	—	24.60	—
2" x 10" x 8'	—	Ea	18.70	—	18.70	—
2" x 10" x 10'	—	Ea	21.40	—	21.40	—
2" x 10" x 12'	—	Ea	28.00	—	28.00	—
2" x 10" x 16'	—	Ea	37.30	—	37.30	—
2" x 12" x 8'	—	Ea	22.40	—	22.40	—
2" x 12" x 10'	—	Ea	31.30	—	31.30	—
2" x 12" x 12'	—	Ea	35.90	—	35.90	—
2" x 12" x 16'	—	Ea	51.40	—	51.40	—
4" x 4" x 6'	—	Ea	30.20	—	30.20	—
4" x 4" x 10'	—	Ea	16.20	—	16.20	—
4" x 4" x 12'	—	Ea	20.00	—	20.00	—
4" x 6" x 8'	—	Ea	19.70	—	19.70	—
4" x 6" x 10'	—	Ea	27.00	—	27.00	—
4" x 6" x 12'	—	Ea	35.70	—	35.70	—
4" x 6" x 16'	—	Ea	48.80	—	48.80	—
4" x 8" x 10'	—	Ea	39.50	—	39.50	—
4" x 8" x 12'	—	Ea	48.80	—	48.80	—
4" x 8" x 16'	—	Ea	64.60	—	64.60	—
4" x 8" x 20'	—	Ea	77.10	—	77.10	—
4" x 10" x 16'	—	Ea	80.30	—	80.30	—
4" x 12" x 12'	—	Ea	76.30	—	76.30	—
4" x 12" x 16'	—	Ea	97.40	—	97.40	—
4" x 12" x 20'	—	Ea	124.00	—	124.00	—
6" x 6" x 8'	—	Ea	32.10	—	32.10	—
6" x 6" x 10'	—	Ea	58.40	—	58.40	—

Pressure treated #2 grade deck posts. For use in contact with the ground. .60 treatment.

4" x 6" x 8'	—	Ea	18.10	—	18.10	—
4" x 6" x 10'	—	Ea	17.50	—	17.50	—
4" x 6" x 12'	—	Ea	35.10	—	35.10	—
4" x 6" x 14'	—	Ea	36.20	—	36.20	—
4" x 6" x 16'	—	Ea	51.60	—	51.60	—
6" x 6" x 8'	—	Ea	32.50	—	32.50	—
6" x 6" x 10'	—	Ea	37.30	—	37.30	—
6" x 6" x 12'	—	Ea	42.00	—	42.00	—
6" x 6" x 16'	—	Ea	51.00	—	51.00	—

Western red cedar deck lumber. Round edge, surfaced four sides.

5/4" x 4" x 8'	—	Ea	5.11	—	5.11	—
5/4" x 4" x 10'	—	Ea	6.27	—	6.27	—
5/4" x 4" x 12'	—	Ea	7.63	—	7.63	—
5/4" x 4" x 16'	—	Ea	10.30	—	10.30	—
5/4" x 6" x 8'	—	Ea	10.57	—	10.57	—
5/4" x 6" x 10'	—	Ea	13.90	—	13.90	—
5/4" x 6" x 12'	—	Ea	16.80	—	16.80	—
5/4" x 6" x 16'	—	Ea	22.00	—	22.00	—
2" x 6" x 8', Select	—	Ea	19.60	—	19.60	—

	Craft@Hrs	Unit	Material	Labor	Total	Sell
Pressure treated deck lumber. .40 treatment. Nominal sizes.						
5/4" x 4" x 8', Premium	—	Ea	4.38	—	4.38	—
5/4" x 4" x 10', Premium	—	Ea	5.32	—	5.32	—
5/4" x 4" x 12', Premium	—	Ea	6.82	—	6.82	—
5/4" x 4" x 16', Premium	—	Ea	9.50	—	9.50	—
5/4" x 6" x 8', Standard and Better	—	Ea	5.53	—	5.53	—
5/4" x 6" x 8', Premium	—	Ea	7.14	—	7.14	—
5/4" x 6" x 10', Standard and Better	—	Ea	6.94	—	6.94	—
5/4" x 6" x 10', Premium	—	Ea	8.97	—	8.97	—
5/4" x 6" x 12', Standard and Better	—	Ea	6.40	—	6.40	—
5/4" x 6" x 12', Premium	—	Ea	10.70	—	10.70	—
5/4" x 6" x 14', Standard and Better	—	Ea	8.11	—	8.11	—
5/4" x 6" x 14', Premium	—	Ea	13.80	—	13.80	—
5/4" x 6" x 16', Standard and Better	—	Ea	10.70	—	10.70	—
5/4" x 6" x 16', Premium	—	Ea	18.00	—	18.00	—
Thompsonized outdoor decking. Nominal sizes. Actual size is about 1/2" less when dry. Pressure treated and water repellent.						
2" x 4" x 8'	—	Ea	4.46	—	4.46	—
2" x 4" x 10'	—	Ea	5.75	—	5.75	—
2" x 4" x 12'	—	Ea	7.20	—	7.20	—
2" x 4" x 16'	—	Ea	10.10	—	10.10	—
2" x 6" x 8'	—	Ea	7.19	—	7.19	—
2" x 6" x 10'	—	Ea	9.45	—	9.45	—
2" x 6" x 12'	—	Ea	11.00	—	11.00	—
2" x 6" x 16'	—	Ea	18.40	—	18.40	—
Deck post surface-mount kit	—	Ea	12.80	—	12.80	—
Deck post, 4" x 4" x 48"	—	Ea	20.60	—	20.60	—
End cut preservative, quart	—	Ea	16.50	—	16.50	—
Composite decking. Composite deck made from recycled fiber and recycled polyethylene plastic. Will not split, warp, rot, cup, or crack. Slip-resistant when wet. Installs with conventional woodworking tools. Use stainless steel nails or screws for best results.						
5/4" x 6" x 8'	—	Ea	29.20	—	29.20	—
5/4" x 6" x 12'	—	Ea	43.80	—	43.80	—
5/4" x 6" x 16'	—	Ea	58.40	—	58.40	—
4" x 4" x 48" deck post	—	Ea	32.60	—	32.60	—
Post cap	—	Ea	10.80	—	10.80	—
Post bracket, joist mount	—	Ea	18.70	—	18.70	—
Post hardware for concrete	—	Ea	55.90	—	55.90	—
Post jacket top	—	Ea	13.30	—	13.30	—
Post sleeve, 4-1/2" x 4-1/2" x 42"	—	Ea	31.20	—	31.20	—
Bevel post cap	—	Ea	4.15	—	4.15	—
Top or bottom rail, 8' long	—	Ea	70.40	—	70.40	—
Square baluster, 32" long	—	Ea	6.45	—	6.45	—
Line rail hardware kit	—	Ea	16.20	—	16.20	—
Stair rail hardware kit	—	Ea	25.20	—	25.20	—
Trex® composite deck. 95% recycled wood and plastic.						
1" x 5-1/2" x 16' grooved edge board	—	Ea	38.50	—	38.50	—
1" x 5-1/2" x 12' grooved edge board	—	Ea	28.90	—	28.90	—
1" x 5-1/2" x 8' board	—	Ea	19.20	—	19.20	—
4 in. x 4 in. x 39 in. Composite Post Sleeve	—	Ea	26.00	—	26.00	—
Hidden Deck Fasteners, 500 per box	—	Ea	169.00	—	169.00	—
Hideaway Universal Hidden Fastener, 90 per box	—	Ea	29.70	—	29.70	—

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