How to Use the Book: The Details

What's Behind the Numbers? The Development of Cost Data

The RSMeans continually monitor developments in the construction industry in order to ensure reliable, thorough, and up-to-date cost information. While overall construction costs may vary relative to general economic conditions, price fluctuations within the industry are dependent upon many factors. Individual price variations may, in fact, be opposite to overall economic trends. Therefore, costs are constantly tracked and complete updates are published yearly. Also, new items are frequently added in response to changes in materials and methods.

Costs—$ (U.S.)

All costs represent U.S. national averages and are given in U.S. dollars. The RSMeans City Cost Indexes can be used to adjust costs to a particular location. The City Cost Indexes for Canada can be used to adjust U.S. national averages to local costs in Canadian dollars. No exchange rate conversion is necessary.

Material Costs

The RSMeans staff contacts manufacturers, dealers, distributors, and contractors all across the U.S. and Canada to determine national average material costs. If you have access to current material costs for your specific location, you may wish to make adjustments to reflect differences from the national average. Included within material costs are fasteners for a normal installation. RSMeans engineers use manufacturers’ recommendations, written specifications, and/or standard construction practice for size and spacing of fasteners. Adjustments to material costs may be required for your specific application or location. The manufacturer’s warranty is assumed. Extended warranties are not included in the material costs. Material costs do not include sales tax.

Labor Costs

Labor costs are based on the average of wage rates from 30 major U.S. cities. Rates are determined from labor union agreements or prevailing wages for construction trades for the current year. Rates, along with overhead and profit markups, are listed on the inside back cover of this book.

• If wage rates in your area vary from those used in this book, or if rate increases are expected within a given year, labor costs should be adjusted accordingly.

Labor costs reflect productivity based on actual working conditions. In addition to actual installation, these figures include time spent during a normal weekday on tasks such as material receiving and handling, mobilization at site, site movement, breaks, and cleanup. Productivity data is developed over an extended period so as not to be influenced by abnormal variations and reflects a typical average.

Equipment Costs

Equipment costs include not only rental, but also operating costs for equipment under normal use. The operating costs include parts and labor for routine servicing such as repair and replacement of pumps, filters, and worn lines. Normal operating expendable, such as fuel, lubricants, tires, and electricity where applicable, are also included. Extraordinary operating expendable with highly variable wear patterns, such as diamond bits and blades, are excluded. These costs are included under materials. Equipment rental rates are obtained from industry sources throughout North America—contractors, suppliers, dealers, manufacturers, and distributors. Rental rates can also be treated as reimbursement costs for contractor-owned equipment. Owners equipment costs include depreciation, loan payments, interest, taxes, insurance, storage and major repairs.

Equipment costs do not include operators’ wages, nor do they include the cost to move equipment to a job site (mobilization) or from a job site (demobilization).

Equipment Cost/Day—The cost of power equipment required for each crew is included in the Crew Listings in the Reference Section (small tools that are considered as essential everyday tools are not listed out separately). The Crew Listings itemize specialized tools and heavy equipment along with labor trades. The daily cost of itemized equipment included in a crew is based on dividing the weekly bare rental rate by 5 (number of working days per week) and then adding the hourly operating cost times 8 (the number of hours per day). This Equipment Cost/Day is shown in the last column of the Equipment Rental Cost pages in the Reference Section.

Mobilization/Demobilization—The cost to move construction equipment from an equipment yard or rental company to the job site and back again is not included in equipment costs. Mobilization (to the site) and demobilization (from the site) costs can be found in the Unit Price Section. If a piece of equipment is already at the job site, it is not appropriate to utilize mobilization costs again in an estimate.

Overhead and Profit

Total Cost including O&P for the Installing Contractor is shown in the last column on the Unit Price and/or the Assemblies pages of this book. This figure is the sum of the bare material cost plus 10% for profit, the bare labor cost plus total overhead and profit, and the bare equipment cost plus 10% for profit. Details for the calculation of Overhead and Profit on labor are shown on the inside back cover and in the Reference Section of this book. (See “How RSMeans Data Works” for an example of this calculation.)

General Conditions

Cost data in this book is presented in two ways: Bare Costs and Total Cost including O&P (Overhead and Profit). General Conditions, or General Requirements, of the contract, should also be added to the Total Cost including O&P when applicable. Costs for General Conditions are listed in Division 1 of the Unit Price Section and the Reference Section of this book. General Conditions for the Installing Contractor may range from 0%
to 10% of the Total Cost including O&P. For the General or Prime Contractor, costs for General Conditions may range from 5% to 15% of the Total Cost including O&P, with a figure of 10% as the most typical allowance.

Factors Affecting Costs
Costs can vary depending upon a number of variables. Here’s how we have handled the main factors affecting costs.

Quality—The prices for materials and the workmanship upon which productivity is based represent sound construction work. They are also in line with U.S. government specifications.

Overtime—we have made no allowance for overtime. If you anticipate premium time or work beyond normal working hours, be sure to make an appropriate adjustment to your labor costs.

Productivity—The productivity, daily output, and labor-hour figures for each line item are based on working an eight-hour day in daylight hours in moderate temperatures. For work that extends beyond normal work hours or is performed under adverse conditions, productivity may decrease. [See "How RSMeans Data Works" for more on productivity.]

Size of Project—The size, scope of work, and type of construction project will have a significant impact on cost. Economies of scale can reduce costs for large projects. Unit costs can often run higher for small projects.

Location—Material prices in this book are for metropolitan areas. However, in dense urban areas, traffic and site storage limitations may increase costs. Beyond a 20-mile radius of large cities, extra trucking or transportation charges may also increase the material costs slightly. On the other hand, lower wage rates may be in effect. Be sure to consider both of these factors when preparing an estimate, particularly if the job site is located in a central city or remote rural location.

In addition, highly specialized subcontract items may require travel and per-diem expenses for mechanics.

Other Factors—
• season of year
• contractor management
• weather conditions
• local union restrictions
• building code requirements
• availability of:
  • adequate energy
  • skilled labor
  • building materials
• owner’s special requirements/restrictions
• safety requirements
• environmental considerations

Unpredictable Factors—General business conditions influence “in-place” costs of all items. Substitute materials and construction methods may have to be employed. These may affect the installed cost and/or life cycle costs. Such factors may be difficult to evaluate and cannot necessarily be predicted on the basis of the job’s location in a particular section of the country. Thus, where these factors apply, you may find significant but unavoidable cost variations for which you will have to apply a measure of judgment to your estimate.

Rounding of Costs
In general, all unit prices in excess of $5.00 have been rounded to make them easier to use and still maintain adequate precision of the results. The rounding rules we have chosen are in the following table.

<table>
<thead>
<tr>
<th>Prices from . . .</th>
<th>Rounded to the nearest</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.01 to $5.00</td>
<td>$0.01</td>
</tr>
<tr>
<td>$5.01 to $20.00</td>
<td>$0.05</td>
</tr>
<tr>
<td>$20.01 to $100.00</td>
<td>$0.50</td>
</tr>
<tr>
<td>$100.01 to $300.00</td>
<td>$1.00</td>
</tr>
<tr>
<td>$300.01 to $1,000.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>$1,000.01 to $10,000.00</td>
<td>$25.00</td>
</tr>
<tr>
<td>$10,000.01 to $50,000.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>$50,000.01 and above</td>
<td>$500.00</td>
</tr>
</tbody>
</table>

How Subcontracted Items Affect Costs
A considerable portion of all large construction jobs is usually subcontracted. In fact, the percentage done by subcontractors is constantly increasing and may run over 90%. Since the workers employed by these companies do nothing else but install their particular product, they soon become expert in that line. The result is, installation by these firms is accomplished so efficiently that the total in-place cost, even adding the general contractor’s overhead and profit, is no more, and often less, than if the principal contractor had handled the installation himself/herself. Companies that deal with construction specialties are anxious to have their product perform well and, consequently, the installation will be the best possible.
Contingencies

The allowance for contingencies generally provides for unforeseen construction difficulties. On alterations or repeat jobs, 20% is not too much. If drawings are final and only field contingencies are being considered, 2% or 3% is probably sufficient, and often nothing need be added. Contractually, changes in plans will be covered by extras. The contractor should consider inflationary price trends and possible material shortages during the course of the job. These escalation factors are dependent upon both economic conditions and the anticipated time between the estimate and actual construction. If drawings are not complete or approved, or a budget cost is wanted, it is wise to add 5% to 10%. Contingencies, then, are a matter of judgment. Additional allowances for contingencies are shown in Division 1.

Important Estimating Considerations

The “productivity,” or daily output, of each craftsman includes mobilization and cleanup time, break time and plan layout time, as well as an allowance to carry stock from the storage trailer or location on the job site up to 200’ into the building and to the first or second floor. If material has to be transported over greater distances or to higher floors, an additional allowance should be considered by the estimator. An allowance has also been included in the piping and fittings installation time for leak checking and minor tightening. Equipment installation time includes the following applicable items: positioning, leveling and securing the unit in place, connecting all associated piping, ducts, vents, etc., which shall have been estimated separately, connecting to an adjacent power source, filling/bleeding, startup, adjusting the controls up and down to ensure proper response, setting the integral controls/valves/regulators/thermostats for proper operation (does not include external building type control systems, DDC systems, etc.), explaining/training owner’s operator, and warranty. A reasonable breakdown of the labor costs is as follows:

1. Movement into building, installation/setting of equipment 35%
2. Connection to piping/duct/power, etc. 25%
3. Filling/flushing/cleaning/touchup, etc. 15%
4. Startup/running adjustments 5%
5. Training owner’s representative 5%
6. Warranty/call back/service 15%

Note that cranes or other lifting equipment are not included on any lines in the Mechanical divisions. For example, if a crane is required to lift a heavy piece of pipe into place high above a gym floor, or to put a rooftop unit on the roof of a four-story building, etc., it must be added. Due to the potential for extreme variation—from nothing additional required to a major crane or helicopter—we feel that including a nominal amount for “lifting contingency” would be useless and detract from the accuracy of the estimate. When using equipment rental from RSMMeans, remember to include the cost of the operator(s).

Estimating Labor-Hours

The labor-hours expressed in this publication are based on Average Installation time, using an efficiency level of approximately 60%-65% (see item 7), which has been found reasonable and acceptable by many contractors. The book uses this national efficiency average to establish a consistent benchmark. For bid situations, adjustments to this efficiency level should be the responsibility of the contractor bidding the project. The unit labor-hour is divided in the following manner. A typical day for a journeyman might be:

1. Study Plans 3% 14.4 min.
2. Material Procurement 3% 14.4 min.
3. Receiving and Storing 3% 14.4 min.
4. Mobilization 5% 24.0 min.
5. Site Movement 5% 24.0 min.
6. Layout and Marking 8% 38.4 min.
7. Actual Installation 64% 307.2 min.
8. Cleanup 3% 14.4 min.
9. Breaks 6% 28.8 min.
100% 480.0 min.

If any of the percentages expressed in this breakdown do not apply to the particular work or project situation, then that percentage or a portion of it may be deducted from or added to labor-hours.

Final Checklist

Estimating can be a straightforward process provided you remember the basics. Here’s a checklist of some of the steps you should remember to complete before finalizing your estimate.

- Did you remember to . . .
  - factor in the City Cost Index for your locale!
  - take into consideration which items have been marked up and by how much?
  - mark up the entire estimate sufficiently for your purposes?
  - read the background information on techniques and technical matters that could impact your project time span and cost?
  - include all components of your project in the final estimate?
  - make use of Minimum Labor/Equipment Charges for Small Quantities (see the following page for more details)!
  - double check your figures for accuracy?
  - call RSMMeans if you have any questions about your estimate or the data you’ve found in our publications? Remember, RSMMeans stands behind its publications. If you have any questions about your estimate . . . about the costs you’ve used from our books . . . or even about the technical aspects of the job that may affect your estimate, feel free to call the RSMMeans editors at 1-800-334-3509.

Free Quarterly Updates

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Using Minimum Labor/Equipment Charges for Small Quantities

Estimating small construction or repair tasks often creates situations in which the quantity of work to be performed is very small. When this occurs, the labor and/or equipment costs to perform the work may be too low to allow for the crew to get to the job, receive instructions, find materials, get set up, perform the work, clean up, and get to the next job. In these situations, the estimator should compare the developed labor and/or equipment costs for performing the work (e.g., quantity × labor and/or equipment costs) with the “minimum labor/equipment charge” within that Unit Price section of the book. These minimum labor/equipment charge line items appear only in Facilities Construction Cost Data and Commercial Renovation Cost Data.

If the labor and/or equipment costs developed by the estimator are LOWER THAN the “minimum labor/equipment charge” listed at the bottom of specific sections of Unit Price costs, the estimator should adjust the developed costs upward to the “minimum labor/equipment charge.” The proper use of a “minimum labor/equipment charge” results in having enough money in the estimate to cover the contractor’s higher cost of performing a very small amount of work during a partial workday.

A “minimum labor/equipment charge” should be used only when the task being estimated is the only task the crew will perform at the job site that day. If, however, the crew will be able to perform other tasks at the job site that day, the use of a “minimum labor/equipment charge” is not appropriate.

Example:
Establish the bid price to install two casement windows. Assume installation of 2’×4’-6” metal clad windows with insulating glass (Unit Price line number 08 52 10.40 0250), and that this is the only task this crew will perform at the job site that day.

Solution:
Step One — Develop the Bare Labor Cost for this task:
Bare Labor Cost = 2 windows @ $41.00/each = $82.00

Step Two — Evaluate the “minimum labor/equipment charge” for this Unit Price section against the developed Bare Labor Cost for this task:
“Minimum labor/equipment charge” = $122.00 (compare with $82.00)

Step Three — Choose to adjust the developed labor cost upward to the “minimum labor/equipment charge.”

Step Four — Develop the bid price for this task (including O&P):
Add together the marked-up Bare Material Cost for this task and the marked-up “minimum labor/equipment charge” for this Unit Price section.
- 2 × ($370.00 + 10%) + [$122.00 + 64.3%]
- 2 × ($370.00 + $37.00) + [$122.00 + $78.45]
- 2 × ($407.00) + $200.45
- $1014.45

ANSWER: $1014.45 is the correct bid price to use. This sum takes into consideration the Material Cost (with 10% for profit) for these two windows, plus the “minimum labor/equipment charge” (with O&P included) for this section of the Unit Price.