Chapter 1

Basic Calculations

RSMeans Building Construction Cost Data (BCCD) is the most widely used reference book for estimating construction costs in the United States and Canada. The costs for each construction item are broken down into the components of material, labor, equipment, and overhead and profit. The book also contains square foot costs by project type. The square foot cost data must be adjusted to fit the specific location, size, and conditions of a particular project. *RSMeans CostWorks*® is the electronic version of *Building Construction Cost Data* and contains all the same information plus additional features—including the ability to adjust all cost figures by a specific location factor, apply quantities to line items, and export cost data to a spreadsheet.

RSMeans Cost Data Format

The RSMeans Unit Price Line

All RSMeans unit price (UP) data are presented in the same basic format.

		03 30 53 Miscellaneous Cast-In-Place Concrete	Crew	Daily Output	Labor Hours	Unit	Bare Mat.	Bare Labor	Bare Equip.	Bare Total	Total Incl. O&P	
40	0010	CONCRETE IN PLACE										40
	0020	Including forms (4 uses), reinforcing steel, concrete, placement,										
	0050	and finishing unless otherwise indicated										
	0300	Beams (3500 psi), 5 kip per L.F., 10' span	C14A	15.62	12.804	CY	291	555	49	895	1,225	
	0350	25' span	C14A	18.55	10.782	CY	305	465	41	811	1,100	

Each line in the RSMeans database contains information unique to that line: a specific 12-digit number address, detailed description, crew, daily output of the task using the noted crew, labor hours for the task using the specific crew, and a unit of measurement. Also included are the unit bare cost (material, labor, equipment, and total) and the total unit cost, including overhead and profit.

Unit price information is presented according to the 50 divisions of the Construction Specifications Institute (CSI) MasterFormat 2011. These divisions are divided into major subdivisions and then into subsections of

similar items. Within each subsection, items are arranged alphabetically by type. Each line item is unique.

Address Number

The address number of the line item shown here can be read as three parts:

03 30 Cast-In-Place Concrete is the Level Two, CSI MasterFormat subdivision. The first two digits of that number represent the Level One, MasterFormat division. (For this item, it is Division 3, or 03, which is Concrete.)

03 30 53 Miscellaneous Cast-In-Place Concrete is the Level Three subdivision.

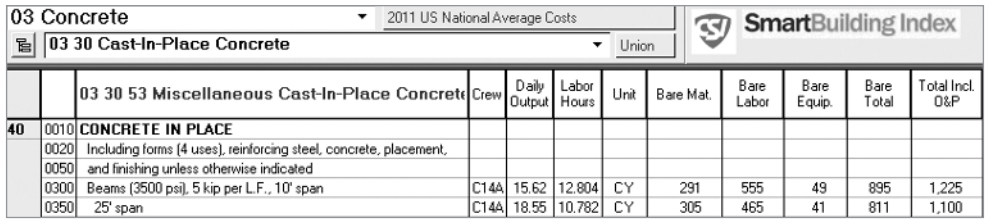
Concrete In Place is the Level Four, RSMeans major classification. It appears in the RSMeans book as a line **03 30 53.40**, while it appears in the *RSMeans CostWorks* CD as just the number **40** in the extreme left and right columns.

0350 (first column from left in the RSMeans book and second column from left in the CD) is the RSMeans individual line number.

Note that while MasterFormat uses a period after the Level Three subdivision (03 30 53.40 0350), the period is not needed to input the line number in RSMeans CostWorks software.

Description

Column 2 (column 3 in the CD) contains a detailed description of the item. For a full description of an item, one must read up through the subsection, including all descriptive information that appears on lines above and to the left of the selected item.



		03 30 53 Miscellaneous Cast-In-Place Concrete	Crew	Daily Output	Labor Hours	Unit	Bare Mat.	Bare Labor	Bare Equip.	Bare Total	Total Incl. O&P
40	0010	CONCRETE IN PLACE									
	0020	Including forms (4 uses), reinforcing steel, concrete, placement,									
	0050	and finishing unless otherwise indicated									
	0300	Beams (3500 psi), 5 kip per L.F., 10' span	C14A	15.62	12.804	CY	291	555	49	895	1,225
	0350	25' span	C14A	18.55	10.782	CY	305	465	41	811	1,100

Thus, the complete description for the item in line 03 30 53.40 0350 is "Concrete in place including forms (4 uses), reinforcing steel, concrete, placement and finishing unless otherwise indicated, Beams (3500 psi), 5 kip per LF, 25′ span."

In the RSMeans print books, the description box of some items may include an illustrative sketch or a reference box. The reference box next to the item indicates an RSMeans reference number or assembly. Reference numbers and assemblies contain detailed information that may be helpful

to the estimator. Several reference boxes indicate that all these notes apply to all the items in that section. For example, R033105–10, R033105–20, R033105–50, R033105–65, R033105–70, and R033105–85 apply to items 03 30 53.40 0010 through 03 30 53.40 7050.

In *RSMeans CostWorks*, if the four-digit portion of the line number is in blue color, it indicates that there is a reference note on that item. You can see the note by clicking on the "Reference" icon and then clicking the titles on the pop-up list. If you double-click an item with a Reference note, a pop-up screen will open showing all items in the database that share this note. Note that these items will be identified only by the last 7 of the 12-digit number. You can then go to any one of these items by clicking the "Go To" button.

Lightly shaded numbers indicate that the item has a graphic illustration. To view it, click the graphics icon (drawing board) on the tool bar. If the line item is green-shaded, it indicates a "Green" item. You can read the "Green" note by clicking on the graphics icon.

Crew

In the database, a crew refers to a unique grouping of workers and equipment, identified by letter and number. The crew on each line includes the trade or trades and equipment required to efficiently perform the indicated task. Crew details are shown in the reference section at the back of the print book, or by clicking on the Crew button  at the top of the *RSMeans CostWorks* screen.

Crew Lookup - based on National Average Costs

File

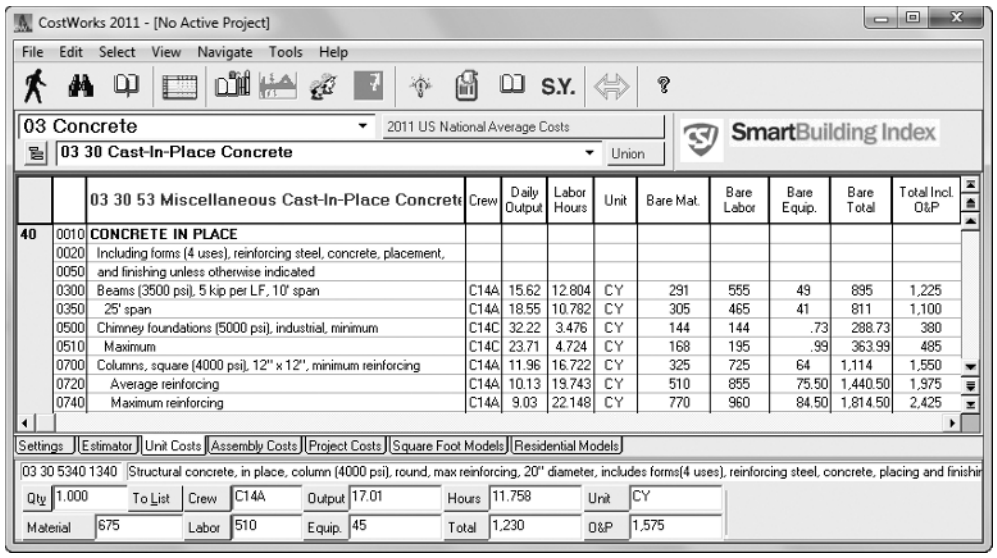
Crew No.		Bare Costs		Incl. Subs O&P		Cost Per Labor-Hour	
Crew C14A (Union)		Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
1	Carpenter Foreman (out)	$45.05	$360.40	$69.12	$552.95	$43.29	$66.72
16	Carpenters	$43.05	$5,510.40	$66.05	$8,454.40		
4	Rodmen (reinf.)	$48.40	$1,548.80	$77.35	$2,475.20		
2	Laborers	$34.35	$549.60	$52.70	$843.20		
1	Cement Finisher	$40.85	$326.80	$59.50	$476.00		
1	Equip. Oper. (med.)	$45.35	$362.80	$67.75	$542.00		
1	Gas Engine Vibrator		$23.20		$25.50		
1	Concrete Pump (small)		$741.00		$815.10	$3.82	$4.20
200 L.H., Daily Totals			$9,423.00		$14,184.35	$47.12	$70.92

Crew labor hours are shown in the lower-left corner of the crew box. In the case of Crew C14A, the total is: 200 LH Daily Totals. This figure represents the total labor hours worked by the 25 members of Crew C14A in a normal eight-hour workday.

If the task is done by one type of laborer with no equipment (e.g., the crew is composed of one trade only), there will be no crew ID. Instead, there will be an abbreviation of that particular labor trade and the number of workers.

For example, most items in section 03 21 10.60 are done by rodmen, abbreviated as Rodm. Hence, Rodm appears in the crew column. The labor trade table on the inside back cover of the *BCCD* lists the abbreviations and their full references. These are also available in *RSMeans CostWorks*.

In *RSMeans CostWorks*, create and open a project, and then select Unit Costs. The screen will display items similar to any page in *Building Construction Cost Data*. Go to the desired item (by scrolling up or down, clicking on the up or down arrows, or using the Go To or Search functions). When you highlight the item (try highlighting item number 03 30 53.40 0300), you see the display of the crew ID in the crew column or the crew box at the bottom of the screen.



You can look at Crew C14A composition and costs by clicking on the crew icon at the top of the screen. Close it by clicking on the X in the upper-right corner.

You can make the crew column, or almost any column, disappear by clicking on the corresponding gray button in the bottom of the screen. You can make it reappear by clicking on the button again. Columns can be expanded by grabbing and dragging the divider lines at the tops of the columns.

Costs in the crew details box are itemized in three ways:

1. Bare costs
2. Including subs O&P (overhead and profit)
3. Cost per labor hour

The bare cost is based on the wages displayed in column A of the table "Installing Contractor's Overhead and Profit" (located on the inside back

cover of the printed book, or under Labor and Crew Information on the reference icon on the *RSMeans CostWorks* toolbar). The cost "Including Subs O&P" is based on the labor wages with add-ons, displayed in columns H and I of the same table. Equipment cost, including O&P, is calculated by adding 10 percent to the bare equipment cost. The cost per labor hour is based on labor and equipment cost, divided by total labor hours.

In our example, total daily labor bare cost of crew C14A is \$360.40 + \$5,510.40 + \$1,548.80 + \$549.60 + \$326.80 + \$362.80 = \$8,658.80/day.

If this number is divided by 200 labor hours per day, we'll get \$43.29 per average labor hour. If we repeat these steps with labor wages including O&P, we'll get \$13,343.60/200 = \$66.72 per average labor hour.

For equipment, total daily bare cost is \$23.20 + \$741.00 = \$764.20, or \$3.82 average per labor hour, or \$840.62/200 = \$4.20 average per labor hour, including O&P. This is a hypothetical number that represents the average equipment cost per labor hour if the equipment costs are spread evenly among all workers.

When a crew contains a 0.5 or 0.25 worker, it means the worker is working a half day (4 hours) or a quarter of a day (2 hours) during a normal workday.

Daily Output

The number of units of a defined task that a designated crew will produce in one eight-hour workday is referred to as the *daily output*. Daily output represents an average figure, which will vary with job conditions. Daily output is measured in the units specified in the unit column. For line 03 30 53.40 0350, the output is 18.55 CY per day. (Refer to this line number in the graphic on the previous page.)

Labor Hours

This number represents the total number of labor hours it takes to produce one unit of this task using the specified crew. Labor hours per unit is calculated by dividing the crew labor hours (found in the crew detail) by the daily output:

$$\text{Labor hours/Unit} = \frac{\text{Daily crew labor hours}}{\text{Daily output}}$$

$$\text{Labor hours/CY} = \frac{\text{200 Labor hours/day}}{\text{18.55 CY/day}} = \text{10.782 Labor hours/CY}$$

This basic relationship of crew labor hours and productivity can be used to calculate labor hours for crews of different composition. It can also be used to calculate the length of time it will take to perform this task with crews of differing composition.

One important observation about the two terms representing productivity—namely, units/day and labor hours/unit—is the adjustment needed when productivity changes. There is an inverse proportionality between the two terms. For example, if productivity decreases, then units/day decreases while labor hours/unit increases, and vice versa.

Unit

In most cases, the unit is self-explanatory, such as CY (cubic yards), SF (square feet), or Ea (each). In some cases, the user might see an unusual unit, such as SFCA (square foot contact area), SQ (square = 100 SF), Cwt (100 pounds), or VLF (vertical linear feet). Refer to the abbreviations list in the reference section of the *BCCD*, or use the abbreviations icon in *RSMeans CostWorks*.

Bare Costs

This category has four columns: Materials, Labor, Equipment, and Total. The numbers here represent the contractor's direct (bare) cost. They do not include any overhead, subcontractors' markups, or profit.

Total Incl. O&P

This column represents the sum of the bare material cost plus 10 percent for profit, the bare labor cost plus labor burden and 10 percent for profit, and the bare equipment cost plus 10 percent for profit. This figure represents the amount the installing contractor may charge to a general contractor or owner.

Productivity and Activity Duration

Labor cost is, without a doubt, the single most unpredictable expense in a construction project. Labor cost can be calculated in at least two ways, as shown in equations (1) and (2):

(1) Labor cost ($) = Activity duration (days) × Crew cost ($/day)

or

(2) Labor cost ($) = Units to be completed × Labor cost ($/unit)

Note: The unit of time used in activity duration could be hours, weeks, or any other unit of time. The crew cost then must be in dollars per the same time unit.

Both methods require knowing the productivity, that is, the total number of units produced by the unit of time. If we define productivity as a crew's daily output (units/day), then:

$$\text{Activity duration} = \frac{\text{Units to be completed (size of job)}}{\text{Daily output}}$$

and

$$\text{Labor unit cost (\$/unit)} = \frac{\text{Crew labor cost (\$/day)}}{\text{Daily output (units/day)}}$$

Then equations (1) and (2) can be rewritten as one equation:

$$(3) \quad \text{Labor cost (\$)} = \frac{\text{Units to be completed}}{\text{Daily output}} \times \text{Crew labor cost (\$/day)}$$

RSMeans productivity figures assume average conditions. Productivity involves two indicators: daily output and labor hours (per unit). For any given task:

$$\text{Labor hours} = \frac{\text{Crew labor hours}}{\text{Daily output}}$$

Example 1

For line 31 23 16.42 1600, an excavation crew (B10T) consists of one equipment operator, 0.5 laborer (4 hours/day), and a front-end loader. It has an output of 800 CY/day. What are the labor hours/CY?

Solution

The total crew labor hours/day for crew B10T is 8 + 4 = 12 labor hours.

$$\text{Labor hours/CY} = \frac{\text{12 labor hours/day}}{\text{800 CY/day}} = \text{0.015 labor hours/CY}$$

Example 2

A crew of three bricklayers and two helpers laid 1,200 bricks in six hours. Calculate the daily output and the labor hours/M bricks.[1]

1. M bricks means a thousand bricks; M in Roman numerals represents 1,000.

Solution

Hourly output = 1,200 bricks/6 hours = 200 bricks/hour

Daily output	= 200 bricks/hour × 8 hours/day
	= 1,600 bricks
	= 1.6 M bricks (M = 1000)
Crew labor hours/day	= 5 workers × 8 hours/day
	= 40 labor hours
Labor hours	= 40 labor hours/1.6 M bricks
Labor hours/M bricks	= 25 labor hours/M bricks

Or:

In 6 hours, the crew puts out 30 labor hours (5 men × 6 hours)

30 labor hours	= 1,200 bricks
1 M bricks	= 1,000 bricks
Labor hours/M bricks	= 30 labor hours × 1,000/1,200
	= 25 labor hours/M bricks

If productivity increases (or decreases) by a certain percentage, the daily output will also increase (or decrease) by the same percentage. The labor hours per unit will go the opposite way—that is, will decrease (or increase) by the same percentage. To understand this, let's consider the following scenario.

Example 3

The productivity of the crew in Example 1 dropped by 20 percent due to some adverse conditions. What would be the new daily output and labor hours/CY?

Solution

$$\text{New output} = 800 \text{ CY/day} \times (100\% - 20\%) = 800 \times (0.80) = 640 \text{ CY/day}$$

$$\text{New labor hours} = 0.015 \text{ LH/CY}/(100\% - 20\%) = 0.015/0.8$$
$$= 0.01875 \text{ LH/CY}$$

Note that dividing by (100% − 20%) is not equal to multiplying by (100% + 20%). In case of a productivity drop, always use (100%−x%). In case of productivity gains, always use (100% + x%), where x is the productivity change.

Example 4

Calculate the estimated duration for excavating 10,000 CY of earth using Crew B10T of Example 1:

Solution

$$\text{Duration} = \frac{10{,}000\ \text{CY}}{800\ \text{CY/day}} = 12.5\ \text{days} \approx 13\ \text{days}$$

Duration varies significantly, not only with productivity but also by crew size or composition, or the number of crews used. Duration has an inverse relationship with productivity—that is, when productivity increases, duration decreases, and vice versa.

The estimator must exercise caution in calculating the duration of an activity. Duration is important for scheduling and calculating the expected finish time (for that activity and the entire project), as well as for estimating general conditions and overhead cost (rent, staff salary, utilities, etc.) of the job.

Equipment Costs

Equipment for each task is shown in the crew detail. Crew equipment cost consists of equipment rental costs plus equipment operating costs.

$$\text{Equipment cost/unit} = \frac{\text{Crew equipment cost/day}}{\text{Daily output}}$$

For line 03 30 53.40 0350:

$$\begin{aligned} \text{Equipment cost} &= \$41.00/\text{CY} \\ &= (\$23.20 + \$741.00)/18.55\ \text{CY/day} \\ &= \$41.20 \qquad \approx \$41.00/\text{CY} \end{aligned}$$

RSMeans cost data for equipment are based on two assumptions:

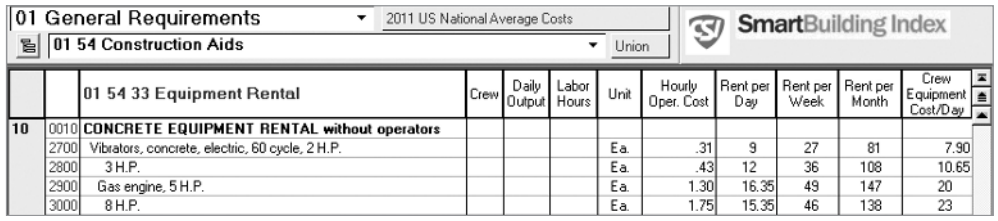
1. Late model, high quality machines in excellent working condition, rented from equipment dealers[2]

2. See RSMeans Reference Number R015433-10.

2. Weekly rental:

$$\text{Crew equip. cost/day} = \text{Hourly oper. cost} \times 8 \text{ hours/day} + \frac{\text{Rent per week}}{\text{5 workdays per week}}$$

For the gas engine vibrator in Crew C14A, refer to line 01 54 33.10 3000 (located at the start of the reference section in the print book).



01 General Requirements | 2011 US National Average Costs | SmartBuilding Index
01 54 Construction Aids | Union

		01 54 33 Equipment Rental	Crew	Daily Output	Labor Hours	Unit	Hourly Oper. Cost	Rent per Day	Rent per Week	Rent per Month	Crew Equipment Cost/Day
10	0010	**CONCRETE EQUIPMENT RENTAL without operators**									
	2700	Vibrators, concrete, electric, 60 cycle, 2 H.P.				Ea.	.31	9	27	81	7.90
	2800	3 H.P.				Ea.	.43	12	36	108	10.65
	2900	Gas engine, 5 H.P.				Ea.	1.30	16.35	49	147	20
	3000	8 H.P.				Ea.	1.75	15.35	46	138	23

For this piece of equipment, the hourly operating cost is $1.75 and the rent per week is $46. The crew equipment cost per day is:

$$\text{Crew equip. cost/day} = \$1.75/\text{hour} \times 8 \text{ hours/day} + \frac{\$46 \text{ per week}}{\text{5 workdays per week}}$$

$$\text{Crew equip. cost} = \$23.20/\text{day}$$

This crew equipment cost per day is shown in the far-right-hand column in the equipment section and is the figure used in the crew detail.
Construction equipment is often rented for periods other than one week or may be owned. Variations in times for equipment rental will be discussed further in Chapter 13.[3]

City Cost Indexes and Location Factors

The costs shown in the unit price section of *Building Construction Cost Data* represent U.S. national average prices and are given in U.S. dollars. The *national average* is an average of costs in 30 major U.S. cities. National average costs should be adjusted to local costs when performing an actual estimate. City cost indexes for 731 U.S. and Canadian cities are available in the reference section of the *BCCD*. The 30-city national average is given a value of 100, and each of the 731 index figures is shown as a value relative to this figure. They are broken down not only by city but also by the major CSI Division.

In the *BCCD*, the location factors list the same factors for 731 cities with the addition of zip codes (but without breakdown by CSI Divisions). To determine the cost in a particular location, multiply the cost by the location factor and divide by 100.

$$\text{Cost in City A} = \text{Nation average cost} \times \frac{\text{Location factor}}{100}$$

3. See also Bledsoe, *Successful Estimating Methods,* p. 79, and Unit Price Estimating Methods, p. 97.

Example 5

What is the cost per CY for the concrete beams in RSMeans item 03 30 53.40 0350 in Omaha, Nebraska?

03 Concrete | 2011 US National Average Costs | SmartBuilding Index
03 30 Cast-in-Place Concrete | Union

		03 30 53 Miscellaneous Cast-in-Place Concrete	Crew	Daily Output	Labor Hours	Unit	Bare Mat.	Bare Labor	Bare Equip.	Bare Total	Total Incl. O&P
40	0010	CONCRETE IN PLACE									
	0020	Including forms (4 uses), reinforcing steel, concrete, placement,									
	0050	and finishing unless otherwise indicated									
	0300	Beams (3500 psi), 5 kip per LF, 10' span	C14A	15.62	12.804	CY	291	555	49	895	1,225
	0350	25' span	C14A	18.55	10.782	CY	305	465	41	811	1,100

Solution

The bare cost per CY for the concrete beams in line item 03 30 53.40 0350 is $811, which includes $305, $465, and $41 for materials, labor, and equipment, respectively. The cost including O&P (overhead and profit) is $1,100/CY. These numbers represent the national average for that item. City cost index, CCI, numbers are broken by division, and by subdivision for concrete. But since this item combines all concrete subdivisions (formwork, reinforcement, and concrete mix and placement), we will use the CCI factors for Division 03 Concrete for Omaha, NE: 94.3 percent for materials, 77.2 percent for installation (labor and equipment), or 86.1 percent for total cost; as a percentage of the national average. Using these factors we can find the cost per CY in Omaha, Nebraska:

$$\begin{aligned}
\text{Cost for materials} &= \$305 \times 94.3\% &&= \$287.62/\text{CY}\\
\text{Cost for labor} &= \$465 \times 77.2\% &&= \$358.98/\text{CY}\\
\text{Cost for equipment} &= \$41 \times 77.2\% &&= \$31.65/\text{CY}\\
\text{Total bare cost} &= \$287.62 + \$358.98 + \$31.53 &&= \$678.25/\text{CY}
\end{aligned}$$

Or

$$\begin{aligned}
&= \$811.00 \times 86.1\% &&= \$698.27/\text{CY}\\
\text{Total cost (incl. O\&P)} &= \$1{,}100 \times 86.1\% &&= \$947.10/\text{CY}
\end{aligned}$$

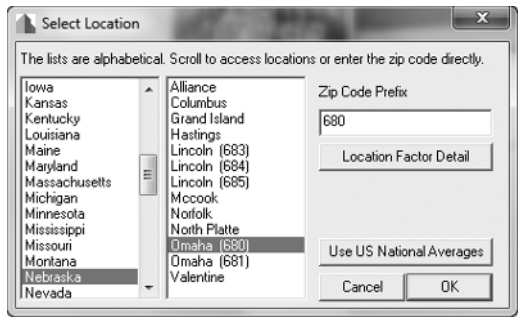
The reason there are two different results for the total bare cost using the two approaches ($687.25 and 698.27) is because these factors were calculated independently. Also, the composition of the cost of the item between the three main categories (materials, labor, and equipment) differs from one item to another. Thus, the cost for an item in Omaha, Nebraska, where most of the cost comes from the labor side, will be overestimated by using the "Total" percentage, 86.1 percent, for adjustment. In general, we will produce more accurate results by adjusting the different categories of cost separately.

City Cost Indexes

DIVISION		NEBRASKA												NEVADA					
		NORFOLK			NORTH PLATTE			OMAHA			VALENTINE			CARSON CITY			ELKO		
		687			691			680 - 681			692			897			898		
		MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL	MAT.	INST.	TOTAL
015433	CONTRACTOR EQUIPMENT		91.8	91.8		101.0	101.0		91.8	91.8		94.6	94.6		100.6	100.6		100.6	100.6
0241, 31 - 34	SITE & INFRASTRUCTURE, DEMOLITION	81.4	90.2	87.5	104.8	91.2	95.4	81.4	90.9	88.0	86.9	94.5	92.2	65.9	102.3	91.0	54.3	102.0	87.2
0310	Concrete Forming & Accessories	84.6	75.0	76.3	98.3	75.7	78.7	93.5	74.6	77.1	86.0	57.0	60.9	101.5	87.1	89.0	108.4	84.6	87.8
0320	Concrete Reinforcing	105.8	49.8	77.0	106.5	77.3	91.5	101.1	76.6	88.5	107.2	46.8	76.1	103.6	119.3	111.7	105.3	93.2	99.1
0330	Cast in Place Concrete	113.4	64.4	94.7	118.9	66.7	98.9	95.3	80.4	89.6	105.1	56.7	86.6	98.2	86.4	93.7	99.1	84.0	93.3
03	CONCRETE	103.5	66.9	86.0	109.5	73.5	92.3	94.3	77.2	86.1	105.9	55.7	81.9	102.3	93.1	97.9	100.0	86.2	93.4
04	MASONRY	122.7	71.0	91.4	93.1	90.5	91.6	102.7	81.6	89.9	105.8	68.4	83.1	116.9	75.8	92.0	119.3	68.5	88.5
05	METALS	94.3	68.1	85.3	93.1	86.9	91.0	97.2	79.1	91.0	104.3	66.3	91.2	94.7	104.2	96.0	93.7	91.4	92.9
06	WOOD, PLASTICS & COMPOSITES	79.1	78.0	78.4	94.6	78.5	85.4	89.2	74.1	80.5	79.0	56.2	65.9	90.2	87.0	88.3	99.6	86.3	92.0
07	THERMAL & MOISTURE PROTECTION	98.3	75.1	89.0	98.8	82.1	92.2	94.5	82.0	89.5	99.0	68.8	87.0	99.7	85.8	94.2	101.0	76.4	91.2
08	OPENINGS	92.3	67.0	85.9	89.9	73.5	85.8	99.0	73.9	92.6	92.4	53.9	82.7	95.2	106.4	98.0	98.0	83.9	94.4
0620	Plaster & Gypsum Board	94.7	77.8	82.8	94.3	77.8	82.7	99.3	73.8	81.4	96.7	55.3	67.5	94.0	86.4	88.7	98.9	85.8	89.6
0950, 0980	Ceilings & Acoustic Treatment	104.9	77.8	86.9	89.5	77.8	81.7	105.8	73.8	84.6	107.4	55.3	72.8	119.1	86.4	97.5	122.0	85.8	98.0
0960	Flooring	126.9	106.0	120.9	100.1	106.0	101.8	131.6	86.6	118.7	129.4	84.3	116.5	101.7	82.7	96.3	107.1	54.0	91.8
0970, 0990	Wall Finishes & Painting/Coating	170.4	68.6	108.6	96.2	68.6	79.4	170.4	70.4	109.7	170.4	71.1	110.2	99.5	85.0	90.7	98.5	85.0	90.3
09	FINISHES	118.9	80.1	97.5	97.7	80.1	88.0	121.1	76.1	96.3	120.9	62.6	88.8	103.2	85.3	93.3	104.6	79.1	90.5
COVERS	DIVS. 10 - 14, 25, 28, 41, 43, 44, 46	100.0	83.0	96.5	100.0	73.4	94.5	100.0	84.0	96.7	100.0	67.6	93.3	100.0	98.3	99.6	100.0	69.3	93.6
21, 22, 23	FIRE SUPPRESSION, PLUMBING & HVAC	94.5	77.1	87.2	100.1	75.4	89.8	99.9	79.9	91.5	94.4	58.8	79.6	99.9	79.9	91.5	97.4	76.5	88.7
26, 27, 3370	ELECTRICAL, COMMUNICATIONS & UTIL.	89.7	84.3	86.8	91.5	83.7	87.3	100.1	84.6	91.9	88.5	94.0	91.4	95.8	100.6	98.3	93.7	100.6	97.4
MF2010	WEIGHTED AVERAGE	98.4	76.4	88.6	97.8	80.9	90.3	99.8	80.6	91.2	99.5	68.7	85.7	98.6	90.8	95.1	97.7	84.4	91.8

City cost indexes are a more detailed version of the location factors. In the city cost indexes (CCI), factors (material, labor, and total) are shown by MasterFormat division. These data are useful when work is limited to a specific division, and will give a more accurate figure than the location factor. Chapter 5 includes examples of the CCI for adjusting prices for each type of work.

In *RSMeans CostWorks*, location factors can be applied by clicking on Location on the Settings tab. A list of states and cities will appear. The three-digit zip code will be shown in a box to the right of the city selected. Click on OK to confirm the selection. You can click on Location Factor Details to view the factors and their breakdown. An alternative method is to simply enter the three-digit zip code in the box if it is known, and click on OK. When you enter the unit price pages, all costs will have been automatically adjusted for the location chosen. The location will be shown in a box in the screen header directly to the right of the division indicator box.



The location factor can be changed at any time by clicking on the Location Factor box and selecting a new location. If you change location after selecting certain items on a CostList, the program will prompt you to verify that you want to update prices. All CostList items will appear in light gray color. If you answer yes, then their prices will change according to the new location, and they will appear in dark black display. It is possible to view a CostList with two different location factors.