

Unit-in-Place Method

In the unit-in-place (or segregated-cost) method, individual unit costs for various building components are applied to the various

unit-in-place method

A cost-estimating method in which total building cost is estimated by adding together the unit costs for the various building components as installed; also called the *segregated-cost method*.

subcomponents in the structure or to linear, area, volume, or other appropriate measures of these components. Using this method the appraiser computes a unit cost based on the actual quantity of materials used plus the labor of assembly required for each square foot of area. For example, the cost can be applied based on the square feet of floor area or linear

feet of wall of a certain height. The same procedure is applied for other structural components.

Unit-in-place cost estimates are made using specific cost data for standardized structural components as installed, such as the following:

Structural Component	Unit
Excavation	Dollars per cubic yard
Foundation	Dollars per linear foot of foundation or cubic yard of concrete
Floor construction	Dollars per square foot
Interior partitions	Dollars per linear foot
Roofing	Dollars per square (i.e., 100 square feet of roof area)

The unit-in-place concept is not limited to cubic, linear, or area units. The measure on which the cost is based may be the measure employed in a particular trade, such as the cost per ton of air-conditioning. The unit-in-place concept may also be applied to the cost of complete, installed components such as the cost of a roof truss that is fabricated off site, delivered, and erected.

All unit costs are totaled to provide the estimated direct cost of the entire improvement. Unit-in-place cost estimates may be based on an appraiser's compiled data, but they are usually obtained from a cost-estimating service that provides updated monthly figures. Contractor's overhead and profit may be included in the unit cost figures provided by some cost services, or they may be computed separately. The appraiser must know exactly what is included in any unit price quoted. Indirect costs are usually computed separately. The objective is to count all appropriate costs and to avoid any double counting.

The following example shows how the cost of a brick veneer wall would be calculated on a unit-in-place basis. Costs such as these vary with market conditions and location. The figures shown are used only for purposes of illustration.

Description	Cost	Unit
4-in. face brick, installed: common bond, ½-in. struck joints, mortar, scaffolding, and cleaning included	\$460.00	per 1,000
Dimension lumber, erected: 2-in.-x-4-in. wood stud framing, 16 inches on center	\$360.00	per 1,000 bd. ft.
Sheathing, installed: impregnated 4 ft. x 8 ft., ½-in.	\$0.42	per sq. ft.
Insulation, installed: 2½-in., foil backing on one side	\$0.22	per sq. ft.
Gypsum board: ½-in. with finished joints	\$0.30	per sq. ft.
Paint: primer and one coat flat	\$0.25	per sq. ft.

From this data the cost per square foot of wall can be estimated as follows:

Description	Cost	Unit
Bricks	\$3.45	per 7½*
Wood stud framing	\$0.24	per ⅔ bd. ft.*
Sheathing	\$0.42	per sq. ft.
Insulation	\$0.22	per sq. ft.
½-in. gypsum board	\$0.30	per sq. ft.
Paint	+ \$0.25	per sq. ft.
Total for finished wall	\$4.88	per sq. ft.

* To calculate a total unit cost, the unit cost of certain construction elements must be converted to the unit measure of the total cost. In this example, each square foot of wall requires 7½ bricks and ⅔ board feet of wood stud framing.

After calculating the unit cost of \$4.88 per square foot, the appraiser can estimate the total cost of a veneer wall that meets these standards without detailing the quantities of material and labor. In practice, a cost analyst would refine the procedure by adjusting for waste and for extra framing for windows and doors, which require wall openings, lintels, and facing corners.

The unit costs for all components can be calculated in a similar fashion and, once these are established, the appraiser can estimate the cost of an entire building. When fully developed, the unit-in-place method provides a substitute for a complete quantity survey and produces an accurate cost estimate with considerably less effort. Table 18.2 illustrates how the unit-in-place method can be used to estimate the reproduction cost of the warehouse shown in Figure 18.2.

In Table 18.2 adjustments are made for the following:

1. Indirect costs not included in the cost manual's base price
2. Indirect costs after construction needed to achieve typical stabilized occupancy
3. Entrepreneurial profit calculated as a percentage of total direct and indirect costs

Note the difference in total adjustments for indirect costs in Tables 18.1 and 18.2. As the cost of the property is broken down into more precise increments using the unit-in-place method, a smaller portion of the total indirect costs is included in the base price quoted in the cost manual for each building component. The single figure of cost per square foot that is used in the comparative-unit method accounts for more of the total indirect costs than the individual cost figures for excavation, site, foundation, framing, and so on. Therefore, the adjustment for "indirect costs not included in cost manual" in the comparative-unit method is smaller than the adjustment for "indirect costs not included in cost manual" in the unit-in-place method.

In the unit-in-place method, the value of site improvements may be estimated separately on a depreciated-cost basis and added to the depreciated cost of the improvements. More typically, the value of site improvements, estimated either on a depreciated-cost basis or extracted from market data, may be added as a contributory amount to total property value.

Table 18.2

Warehouse Property—Unit-in-Place Method

Excavation	59,400 cu. ft. @ \$0.24 per cu. ft. =	\$14,256
Site	115,385 sq. ft. @ \$0.17 per sq. ft. =	19,615
Foundation	59,400 sq. ft. @ \$1.79 per sq. ft. =	106,326
Framing	59,400 sq. ft. @ \$4.82 per sq. ft. =	286,308
Floor (concrete)	59,400 sq. ft. @ \$3.12 per sq. ft. =	185,328
Floor (asphalt tile)	4,400 sq. ft. @ \$1.02 per sq. ft. =	4,488
Ceiling (acoustical tile)	4,400 sq. ft. @ \$4.35 per sq. ft. =	19,140
Plumbing (three rooms)		
Fixtures	9 fixtures @ \$2,525 per fixture =	22,725
Drains	6 units @ \$380 per unit =	2,280
Sprinkler system	59,400 sq. ft. @ \$1.48 per sq. ft. =	87,912
HVAC	55,000 sq. ft. @ \$0.84 per sq. ft. =	46,200
	4,400 sq. ft. @ \$4.20 per sq. ft. =	18,480
Electrical and lighting	59,400 sq. ft. @ \$1.70 per sq. ft. =	100,980
Exterior wall		
Concrete block	15,180 sq. ft. @ \$12.09 per sq. ft. =	183,526
Brick facade	5,060 sq. ft. @ \$13.80 per sq. ft. =	69,828
Partition		
Walls	8,650 sq. ft. @ \$3.70 per sq. ft. =	32,005
Doors	10 sq. ft. @ \$103 per sq. ft. =	1,030
Overhead doors (10 ft. × 12 ft. × 4)	480 sq. ft. @ \$18.25 per sq. ft. =	8,760
Roof joists and deck	59,400 sq. ft. @ \$6.86 per sq. ft. =	407,484
Roof cover and insulation	59,400 sq. ft. @ \$2.18 per sq. ft. =	129,492
Miscellaneous specified items		30,000
Subtotal		\$1,776,163
Current cost multiplier (different base from Table 18.1)		× 1.030
Subtotal		\$1,829,448
Local cost multiplier		× 0.980
Total cost (from manual—\$30.18 per sq. ft.)		\$1,792,859
Indirect costs not included in cost manual*		× 1.100
Subtotal		\$1,972,145
Indirect costs from completion to date of stabilized occupancy*		× 1.050
Subtotal		\$2,070,752
Entrepreneurial profit at 10.0% of total direct and indirect costs		
\$2,070,752 × 0.10		+ 207,075
Total cost (\$38.35 per sq. ft.)		\$2,277,827
	(rounded)	\$2,278,000
Plus site value and site improvements		+ 650,000
Total project value		\$2,928,000

Source: Marshall Valuation Service

* Note: Contractor's overhead and profit and some indirect costs are included in the base costs. Architect's fees and other indirect costs are not. The source of published cost data should be studied for a complete understanding of what is included in the quoted costs. For purposes of simplicity, a percentage was applied to account for indirect costs.