

Technical Report

Construction Costs in the LA Metro Area

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RS Means Building Construction Cost Data Analysis¹

1. Introduction

The RS Means Building Construction Cost 64th and 67th editions (2006 and 2009) provides estimates of the per square foot construction cost for several types of commercial structures in the Los Angeles Metropolitan Area, consisting of the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The types of construction include apartment buildings, department stores, factories, office buildings and retail stores.

2. Methodology

Table 1 shows the estimates of per square foot construction costs for the various types of commercial structures in the LA Metropolitan Area. The median, 25th percentile and 75th percentile cost of different types of construction are all provided by the Cost Data manual. The figures given are for an average location. Apartment and office buildings were further divided into categories of low-, medium-, and high-rise to take into consideration the effect of size on square foot costs. To determine the costs for a specific location, the county-specific cost index is needed. Table 2 gives the location index of the six counties in the Los Angeles Metropolitan Area. The square foot costs for a specific location, the county-specific adjustment factor is calculated by multiplying the median square foot costs of the average location by the county cost index. Table 3 lists the county-specific adjustment factors for the six counties. Table 4 lists the city cost indexes for all the cities in the Los Angeles Metropolitan Area. All the data are for the year 2006.

For each commercial or industrial type of a specific city, the total square foot cost is calculated according to the formula:

$$\text{Square Foot Costs} = \text{Median Cost} * \text{Project Size Modifier} * \text{City Cost Index}$$

The “project size modifier” is determined by the size factors or the area conversion scale. The size factor is determined by dividing the project area by the typical project size for the particular building type. The formula is as follows:

$$\text{Size Factor} = \text{Proposed Building Area} / \text{Typical Size from Below}$$

To get the project size modifier, one should use the “Cost Modifier Curve”, which gives a mapping from the size factor to the cost multiplier. For the cost modifier curve and more details about the project size modifier, refer to the *RS Means Building Construction Cost Data*, 64th Edition (2006) on page 750.

The County-specific adjustment factors are calculated according to the formula:

¹ Construction costs depend on topography. In private correspondence, Means indicated that topography is too heterogeneous for this to be accounted for in a formula. Instead, the increase in construction costs due to a steep or hilly lot needs to be accounted for by lot-specific appraisal. RA notes that this is particularly true in the LA area, where account needs to be taken of landslides and earthquakes.

County-Specific Adjustment Factor=Median Cost * County Cost Index

3. Data

RS Means derived the square foot costs from a database containing approximately 11,200 completed construction projects. The figures include the contractor’s overhead and profit, but not architectural fees or land costs. The figures have been adjusted to the January of the year. The median cost is the 50% of the cost of projects in the data base, the low and high cost are the 25% and 75% percentiles, respectively.

Table 1 Square Foot Costs of 2006

Structure	25 th Percentile	Median Cost	75 th Percentile
Apartment (low rise)	56.5	71	94
Apartment (mid rise)	74.5	90	110
Apartment (high rise)	84.5	102	117
Department Store	48.5	66	83
Factory	43	64	98.5
Office (low rise)	77.5	99.5	130
Office (mid rise)	82.5	100	132
Office (high rise)	101	128	157
Retail Store	52	70.5	92.5

Sources: Table 01, 02, 03, 30, 34, 61, 62, 63, *RS Means Building Construction Cost Data*, 64th Annual Edition, 2006, pp 742-744, 746-747.

Table 2 County Cost Indexes of 2006

County	County Cost Indexes
Imperial	1.017
Los Angeles	1.068
Orange	1.061
Riverside	1.055
San Bernardino	1.024
Ventura	1.065

Note: The County Cost Index for a county was calculated at the city cost index for a particular city. Los Angeles County, Los Angeles; Orange County, Anaheim; Riverside County, Riverside; San Bernardino County, San Bernardino; and Ventura County, Oxnard. Since the handbook did not provide a city cost index for any city in Imperial County, Mojave was used since its climate and demographic composition are comparable to those in Imperial County. The city cost indexes were obtained from *RS Means Building Construction Cost Data*, 64th Annual Edition, 2006, pp. 547-548.

Table 3 County-Specific Adjustment Factors

Structure	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Apartment (low rise)	72.21	75.83	75.33	74.91	72.70	75.62
Apartment (mid rise)	91.53	96.12	95.49	94.95	92.16	95.85
Apartment (high rise)	103.73	108.94	108.22	107.61	104.45	108.63
Department Store	67.12	70.49	70.03	69.63	67.58	70.29
Factory	65.09	68.35	67.90	67.52	65.54	68.16
Office (low rise)	101.19	106.27	105.57	104.97	101.89	105.97
Office (mid rise)	101.7	106.8	106.1	105.5	102.4	106.5
Office (high rise)	130.18	136.70	135.81	135.04	131.07	136.32
Retail Store	71.7	75.29	74.80	74.38	72.19	75.08

Note: The County-Specific Adjustment Factors are calculated according to the formula: County-Specific Adjustment Factor=Median Cost * County Cost Index. The data are from Table 1 and 2 above.

Table 4: City Cost Indexes

City	City Cost Indexes
Alhambra	1.055
Anaheim	1.061
Inglewood	1.03
Long Beach	1.038
Los Angeles	1.068
Mojave	1.017
Oxnard	1.065
Pasadena	1.044
Riverside	1.055
San Bernardino	1.024
Santa Ana	1.035
Van Nuys	1.06

Resources: *RS Means Building Construction Cost Data*, 64th Annual Edition, 2006, pp547-549.

4. References

RS Means Building Construction Cost Data, 64th Annual Edition, 2006.
RS Means Building Construction Cost Data, 67th Annual Edition, 2009.

RS Means Residential Cost Data Analysis²

1. Introduction

The RS Means Residential Construction Cost Data, 25th Annual Edition (2006) provides estimates of the per square foot construction costs for different types of residential structures. The building types are differentiated by square footage, number of stories, and quality of building materials. Four quality types are considered: economy, average, custom, and luxury.

2. Methodology

The Cost Data manual provides estimates of per square foot construction costs for a “typical” residential structure of the different quality types and of different floor areas. A typical house of a particular quality is defined in terms of some two dozen attributes. A typical, economy house does not have air conditioning in the heating duct system, but other typical houses of higher qualities do; a typical economy house has lower-quality building materials than a typical average house; etc. Adjustments may then be made to account for upgrades for each quality type.

Nine housing types were chosen in the research, as are listed in Table 1. The notes to the table provide information on the adjustments made for each housing type. For example, the 1600 sq. ft. 1 story economy house is the standard detached house of its type with no garage, 1.5 bathrooms, wood siding and wood frame, with the single adjustment that the air conditioning is built into the heating ducts. All houses except the 1000 sq. ft. row house are either 1600, 2400, or 3200 sq. ft. to permit quality deterioration as a house ages, *viz.* as it deteriorates, a custom 2400 sq. ft. house becomes equivalent in quality first to a new average 2400 sq. ft. house and then to a new economy 2400 sq. ft. house.

For each housing type, total cost is calculated according to the formula

$$\text{Total cost} = (\text{base cost per square foot}) * (\text{total square feet}) + \text{extra modification cost}$$

$$\text{Per square foot cost} = \text{Total cost} / \text{square feet}$$

The base cost figures are for detached homes. An additional adjustment is made for semi-detached homes, and for interior and end row house units. The procedure is given in the handbook. The extra modification cost is added if according to the quality of the house, such as adding the garage, adding additional bath, upgrade kitchen cabinets, adding air conditioning and heating ductwork, or adding fireplace and chimney. The base cost, extra modification cost and the total cost for the nine housing types are given in table 1.

² Construction costs depend on topography. In private correspondence, Means indicated that topography is too heterogeneous for this to be accounted for in a formula. Instead, the increase in construction costs due to a steep or hilly lot needs to be accounted for by lot-specific appraisal. RA notes that this is particularly true in the LA area, where account needs to be taken of landslides and earthquakes.

The figures given in the tables are for an average location. To determine the costs for a specific location, a city-specific adjustment factor needs to be applied. Table 2 lists city-specific adjustment factors for those cities in the Los Angeles region that are listed in the handbook.

3. Data

All the data were obtained or calculated from the handbook, including the base cost, extra modification cost and city-specific location factors. The figures of total cost reported in Tables 1 were computed according to the formula as described above.

Table 1 Total Cost of Different Housing Types

Type of Residence	Square Feet	Base Cost	Extra Modification Cost	Total Cost
Economy: 2 Story House	1000 sq. ft.	83.04	1700	84740
Economy: 1 Story House	1600 sq. ft.	66.8	6296.5	113176.5
Economy: 1 Story House	2400 sq. ft.	59.05	22401	164121
Average: 1 Story House	1600 sq. ft.	98	16975.5	173775.5
Average: 1 Story House	2400 sq. ft.	87.95	21575	232655
Average: 1 Story House	3200 sq. ft.	81.55	33253.5	294213.5
Custom: 1 Story House	2400 sq. ft.	108.05	24340	283660
Custom: 1 Story House	3200 sq. ft.	98.35	31835	346555
Luxury: 1 Story House	3200 sq. ft.	118.95	45738	426378

Notes:

1. The nine housing types above are:
 1. Economy 2 story row house 1000 square feet. No garage. 1 bath. Wood siding, wood frame. Add air conditioning in heating duct work. The only upgrade (compared to the base house of this type) is air conditioning in the heating duct work.
 2. Economy 1 story detached 1600 square feet. No garage. 1 1/2 bath. Wood siding, wood frame. Add air conditioning in heating duct work. . Upgrades (compared to the base house of this type) are additional 1/2 bath and air conditioning in the heating duct work.
 3. Economy 1 story detached 2400 square feet. One-car detached garage. 2 baths. Wood siding, wood frame. Add air conditioning in heating duct work. Upgrades (compared to the base house of this type) are the garage, an additional bath and air conditioning in the heating duct work.
 4. Average 1 story detached 1600 square feet. One-car attached garage. 1 1/2 bath. Brick veneer, wood frame. Add air conditioning in heating duct work. . Upgrades (compared to the base house of this type) are the garage, additional 1/2 bath and air conditioning in the heating duct work.
 5. Average 1 story detached 2400 square feet. One-car attached garage. 2 baths. Brick veneer, wood frame. Add air conditioning in heating duct work. Upgrades (compared to the base house of this type) are the garage, an additional bath and air conditioning in the heating duct work.
 6. Average 1 story detached 3200 square feet. Two-car attached garage. 2 1/2 baths. Brick veneer, wood frame. Add air conditioning in heating duct work. Upgrades (compared to the base house of this type) are the garage, 1 1/2 additional bath and air conditioning in the heating duct work.
 7. Custom 1 story detached 2400 square feet. Two-car attached garage. 2 baths. Upgrade kitchen cabinets. Stone veneer, wood frame. Upgrades (compared to the base house of this type) are the garage, 1/2 additional bath and upgrade kitchen cabinets.
 8. Custom 1 story detached 3200 square feet. Two-car attached garage. 2 1/2 baths. Upgrade kitchen cabinets. Fireplace and chimney. Stone veneer, wood frame. Upgrades (compared to the base house of this type) are the garage, 1 additional bath upgrade kitchen cabinets, fireplace and chimney.

9. Luxury 1 story detached 3200 square feet. Two-car attached garage. 3 baths. Upgrade kitchen cabinets. Fireplace and chimney. Solid masonry. Upgrades (compared to the base house of this type) are the garage, additional 1 1/2 bath, upgraded kitchen and cabinets, fireplace and chimney.
2. For the figure of the row house base cost, take the average cost of inner and end unit cost. Inner unit costs 95% of the detached house of the same type and end unit costs 97%.
3. Extra modification cost is calculated according to the additional qualities as in note 1.
4. Where the house is wood frame, assume that the garage is too. Where the house has masonry, assume that the garage does too.
5. No basement for any of the houses.

Resources: *RS Means Residential Construction Cost Data*, 25th Annual Edition, 2006, pp. 24, 28, 38, 60, 78, 96.

Table 2 City-Specific Location Factor

City	Location Factor
Alhambra	1.09
Anaheim	1.07
Inglewood	1.05
Long Beach	1.03
Los Angeles	1.06
Mojave	1.05
Oxnard	1.07
Pasadena	1.05
Riverside	1.07
San Bernardino	1.05
Santa Ana	1.06
Van Nuys	1.08

Resources: *RS Means Residential Construction Cost Data*, 25th Annual Edition, 2006, pp.570.

4. References

RS Means Residential Construction Cost Data, 25th Annual Edition, 2006