Chapter 37
The Appraiser's Cost Approach

INTRODUCTION
The cost approach for estimating current market value starts with the recognition that a parcel of real estate contains two components - the land and the improvements. The appraiser separates these two components and attempts to place a dollar value on each. To obtain a dollar estimate of market value for a specific residential or commercial site, the appraiser must analyze the market for residential or commercial land sales. To the value of the land, the appraiser adds the cost of constructing a building that is a replica or at least a close substitute for the subject property. Finally, if the subject property is not new, the appraiser subtracts the depreciation that the subject property has undergone from the cost of constructing the substitute.

ESTIMATING SITE VALUE
The appraiser can use any one of several procedures to estimate the market value of the site. The most useful technique is the sale comparison approach which compares comparable sites with the land component of the subject property. The second technique is the extraction procedure that requires first an estimating of the market value of the whole property and then the division of the overall market value between land value and the value of the improvements on the site.

| (a) | THE SALES COMPARISON APPROACH - The sales comparison approach to valuing land is similar to the sales comparison approach to valuing the whole property - land and improvements. The only difference is that there is no analysis of the physical features of an improvement in the market comparison procedure for estimating the value of land. The elements of this procedure are the analysis of the physical features of the lot, the locational attributes of the site, the availability of public services, and the quality of adjacent improvements that affect the market value of the site. Once the appraiser finds comparable sites that are very similar to the subject property with respect to physical, locational, and neighborhood features, he or she makes adjustments to compensate for any differences. Then the appraiser examines the other aspects of comparability—the market conditions at the time of sale for the comparable properties, the financing used in the purchase, and the property rights transferred in each sale. |
| (b) | THE EXTRACTION PROCEDURE - The extraction procedure starts with an analysis of comparable properties that have sold in the recent past. The land component of the comparable properties must be very similar to the land component of the subject property. The appraiser analyzes these comparable properties to identify the most comparable |
property with regard to the site. Then the appraiser separates the sales price of the most comparable property into the value of the land and the value of the improvements by estimating the depreciated construction cost of the improvements and subtracting that figure from the sales price of the whole property. The difference between these two figures is the value of the land. If the subject property, viewed as a vacant parcel of land, is similar to the land component of this recently sold property, the appraiser has an estimate of the value of the subject land.

In actual practice, appraisers use the sales comparison method more than the extraction procedure to estimate the value of the site in the cost approach. However, if comparable land sales data are not available, the extraction procedure is a useful method.

**ESTIMATING THE COSTS OF THE IMPROVEMENTS**

In the cost approach, the process used to obtain a value for the structure relies on the cost to construct a replica of the subject property (reproduction cost) or the cost to construct an equally useful substitute for it (replacement cost).

| (a) | **REPRODUCTION AND REPLACEMENT COST OF NEW IMPROVEMENTS** -
|     | **Reproduction cost** is the current cost to construct a building that is the same as the subject property in all respects—a replica. In the physical sense, reproduction assumes as fact that the materials, quality of work, and technology used in the original construction of the subject property are still available today. Reproduction cost is the dollar outlay required to create the replica of the subject property based on current prices of building materials and construction labor. Conceptually, the materials and the quality of work would be the same as those used originally in the construction of the subject property. However, some appraisers only require a high degree of similarity in materials and technique.
|     | **Replacement cost** is the current cost to construct a new improvement that serves the same purpose as the subject property and that is as useful as the subject property in meeting the needs of the owner. However, the construction of the new building uses currently available building materials, manual skill, technology, design and floor layout. Replacement cost is the dollar amount paid for labor, and materials at current prices.
|     | If the subject property is relatively new, reproduction cost is appropriate to use in estimating the construction cost of that property. The quality of building materials, the type of material used, the manual skill involved in the construction process, and the techniques used in construction do not change drastically in short periods of time. Appraisers believe the accuracy of the reproduction cost method is very acceptable for structures that are new to ten or even fifteen years old. The accuracy may be acceptable even for
structures as old as twenty to twenty-five years old.

If the subject property is older than twenty-five years or so, the appraiser would use replacement cost to estimate the cost of constructing a similar building that meets the needs of the owner. In this situation the appraiser uses current materials and techniques to estimate the construction cost of a new replacement building for the subject property that would provide the same use and benefits to the owner.

In practice, reproduction cost is the most commonly used cost approach for estimating value. Replacement cost is less useful because it is difficult to identify and measure what is "equal utility," and because construction materials and standards of manual skill change over time. In summary, the cost approach relies on estimating the reproduction cost for a new building using current standards of materials, manual skills, and construction technology.

(b) DIRECT AND INDIRECT COSTS - The appraiser must include both direct (hard) and indirect (soft) costs in the reproduction cost estimate. Direct costs are the costs for land, labor, materials, and construction financing. Indirect costs include architects' fees, engineering studies, permits, advertising costs, brokerage fees, and builder profits. If the appraiser only uses the direct costs in the construction cost estimate, the value conclusion will underestimate reproduction cost.

METHODS OF ESTIMATING REPRODUCTION COST

The appraiser can use three methods to estimate the reproduction cost of a new structure: the quantity survey method, the unit-in-place method, and the comparative method.

(a) THE QUANTITY SURVEY METHOD - The quantity survey method is the most comprehensive of the three methods used to estimate construction cost. To use it the appraiser must first identify the quantities of all materials and labor used in the construction process. That means quantifying all materials used in the various parts of the structure, for example, the number of cubic yards of concrete and/or the number of cement blocks used to construct the foundation, the number of boards or the amount steel used in the construction of the structural frame, the amount of brick to construct the exterior walls, the number of plywood panels to construct the floors, and all other such materials. In addition, the appraiser quantifies the labor required to assemble these materials. The appraiser ascertains the number of hours that concrete masons, carpenters, plumbers, and electricians work to construct the finished product. Then, the appraiser multiplies all of the material and labor units by their current prices or wage rates to obtain an estimate of the major direct costs incurred in the construction of the building.
In addition to the direct costs of construction, the appraiser must estimate a dollar value for the indirect costs of construction such as fees for the professional services of architects, engineers, surveyors, and lawyers; overhead expenditures of the developer including the cost of building permits and licenses; insurance premiums and property tax outlays during the construction the interest payments on the construction loan; selling expenses of the developer, and the developer's profit. When the appraiser adds these indirect costs of construction to the direct costs of construction on a per unit basis, the appraiser has a detailed estimate of the reproduction cost of a structure that is a replica of the subject property.

Because of the enormous degree of specificity required, appraisers rarely use the quantity survey technique in actual practice. However, an understanding of its structure does set the basis for an understanding of what the appraiser is attempting to accomplish in the cost estimating process.

(b) THE UNIT-IN-PLACE METHOD - The unit-in-place method (also called the "subcontractor method") of estimating the reproduction cost of a new improvement is based upon the fact that a structure consists of major components such as the foundation, the frame and exterior walls, the flooring, the plumbing system, the electrical system, the heating and air-conditioning system, and the roof. The appraiser estimates the reproduction cost by calculating the cost of constructing each of these major components. Construction firms specialize in installing these major components. When requested to perform such a service, a firm or subcontractor calculates the cost of materials, the cost of labor, the cost of equipment, and the indirect costs to construct or install the component. From these direct and indirect cost estimates, the subcontractor specifies a price for installing the component. Using prices quoted by the subcontractors, the appraiser can estimate of the reproduction cost for a new improvement by simple addition.

(c) THE COMPARATIVE METHOD - The comparative method for deriving the reproduction cost of a new structure relies on published data on construction costs for specific types of buildings units and the appraiser's knowledge of local costs of construction. For example, if the standard construction costs for main floor living area of a brick ranch house are $100.00 per square foot and if the subject property is a similar type of house with 1,900 square feet of main floor livable space, its main floor reproduction cost is the product of multiplying 1,900 square feet by $100.00 per square foot or $190,000.00. If $100.00 per square foot accurately represents current prices and if the construction techniques and materials used to build the subject are standard, then $190,000.00 is a fairly accurate estimate.

The appraiser can draw upon various data sources that provide construction costs per square foot for various sizes and types of structures. In addition, data services provide figures on changes in the prices of building material and in the wage rates of construction.
labor. By using these data sources and local information, the appraiser can quickly estimate the reproduction cost of a structure in the local market. Conceptually, the comparative technique is the least accurate of the three cost estimating techniques because it is less specific and comprehensive than the quantity survey or the unit in place method. However, in practice, the comparative technique may be the most accurate because the typical appraiser's expertise is not in construction techniques that underlie the quantity survey and unit-in-place methods.

### ESTIMATING ACCRUED DEPRECIATION: TYPES OF DEPRECIATION

When the appraiser estimates reproduction cost for a new structure, he or she recognizes that there are differences between the new structure and the subject property (which is not a newly constructed unit). These differences require an adjustment to account for all of the possible value-reducing phenomena that have affected the subject property. The dollar adjustment made to account for the value reduction is the accrued depreciation. As a background for estimating accrued depreciation, the appraiser examines three categories of value-reducing factors—physical deterioration, functional obsolescence, and external obsolescence.

| (a) PHYSICAL DETERIORATION | Physical deterioration is the reduction in value caused by wear and tear and/or disintegration of the structural components and fixtures of the building. Examples of physical deterioration are damage from termites or other wood destroying organisms, cracks in plaster or wallboard, deterioration of roof shingles causing leaks and discoloration of ceilings, cracks in concrete foundations due to uneven settling, and a general wearing out of mechanical systems in the house due to continued use over time. Physical deterioration is either curable or incurable, depending on the costs of repairing or replacing the deteriorating items in the structure. If the repair cost is less than or equal to the increase in the structure's value after the repairs, the physical deterioration is curable. However, if repair cost exceeds the increase in value consequent upon that repair, the physical deterioration is incurable. The dollar estimate of curable physical deterioration is simply the cost to repair or replace the deteriorated component of the structure. The dollar estimate for incurable physical deterioration is a judgment made by the appraiser concerning the amount by which the typical buyer would reduce his or her offer for the property because of the existence of the physical deterioration. Regardless of whether physical deterioration is curable or incurable, the appraiser must take note of it and estimate its value-reducing impact on the market value of the structure. |
| (b) FUNCTIONAL OBsolescence | Functional obsolescence is the reduction in value generated by inherent defects in the design of the structure or by changes in consumer attitudes toward the design of the structure and its fixtures. Regardless of the cause, functional
obsolescence reduces the utility or satisfaction that the typical consumer derives from the property. Examples of functional obsolescence are small room sizes and irregular room layout that make it difficult to use currently desirable sizes and styles of furniture, and antiquated bathroom, kitchen and lighting fixtures that no longer meet current needs or tastes.

Functional obsolescence may also be curable or incurable. As with physical deterioration, the distinction between curable and incurable depends upon the relation between the cost to replace or change and the value that the replacement or change may add to the market value of the structure. If the replacement or change of a feature in the structure adds more to the market value than the cost of the change, the functionally obsolescent feature is curable. If the cost to replace, remove, or add exceeds the addition to the market value, the functionally obsolescent feature is incurable. Items often classified as curable functional obsolescence include an insufficient number of electrical outlets, insufficient closet or cabinet space, and inadequate water heating capacity. Items of incurable functional obsolescence usually pertain to a structure’s basic design and systems. Ceilings that are too high; inefficient traffic patterns; inadequate heating, electrical, plumbing, and air-conditioning systems; and an insufficient number of bathrooms are examples of functional incurable obsolescence.

To establish a dollar value for functional obsolescence, the appraiser must first ascertain the cost to replace, the cost to remove or add, or the cost to change the obsolete feature. Once the appraiser has this information, the appraiser can make an estimate of functional obsolescence. The dollar estimate of curable functional obsolescence is the difference between (1) what it would cost to add a missing feature or to remove or change a feature on the date of the appraisal and (2) the cost of incorporating or omitting this feature as part of the construction cost of the total structure on the same date. The underlying premise is that additions or removals after the initial construction are more expensive than inclusion or exclusion during the original construction phase.

The dollar estimate of incurable functional obsolescence is the difference between what the missing or obsolete feature could add to the value of the improvement and what it would have cost to include that feature in the original construction. The appraiser often develops this estimate from comparable rental or sales data. For example, the appraiser knows from experience or can determine from market data that four-bedroom houses of a certain size, style, and quality located in a certain neighborhood typically sell for $2,500.00 more than three-bedroom houses of the same style and in the same neighborhood. The appraisal also can determine that the reproduction cost of that fourth bedroom is $3,500.00; in other words, there is a $3,500.00 difference in the construction costs of the four-bedroom and the three-bedroom houses. Given these two facts, the appraiser knows that the dollar value of incurable functional
obsolescence in this case is $1,000.00, the difference between the $3,500.00 reproduction cost and the $2,500.00 market premium for a fourth bedroom.

| EXTERNAL OBsolescence | External obsolescence is the value reduction caused by changes in economic, demographic, or locational influences outside the subject property. Negative influences from natural features such as swamps and polluted creeks, poorly maintained adjacent properties, and nearby dirty industries or airports and major highways generate external obsolescence. External obsolescence is not curable since the source is not inherent in the property and changes to the improvements have no effect on it. The appraiser determines the dollar value of incurable external obsolescence by an analysis of the market in which he or she identifies comparable properties that are not affected by the value-reducing external obsolescence features and obtains the market value or rental value of such properties. Then the appraiser finds comparable properties that are affected by value-reducing economic or locational features and obtains the market value or rental value of these properties. The dollar estimate of external obsolescence is the difference between the market values of these two sets of comparable properties.

The impact of external obsolescence upon the land will usually be reflected in the valuation of the site through analysis of the comparables and the value inferred from them. While land is usually thought not to suffer from obsolescence as such, some value diminution can result that hasn’t been revealed by the analysis of the comparable properties. Then the appraiser may assign some loss in value to the land. For example, assume that the factor causing external obsolescence is deterioration in the quality of adjacent properties. If comparable properties in the neighborhood are selling for $35,000.00, whereas comparable properties in a neighborhood that does not contain deteriorating structures are selling for $42,000.00, the dollar estimate of external obsolescence is $7,000.00. The appraiser must make a judgment about what percent of the value loss to allocate to the land and then subtract the remaining percentage of the total value loss from external obsolescence from the reproduction cost of the new improvement to represent incurable external obsolescence.

The appraiser can establish the value reduction by examining the difference between rents of properties in a good neighborhood and those in a poor neighborhood. The difference in rent revenues between comparable properties serves as an indication of the value-depressing factors operating in the poor neighborhood. To calculate the value reduction, the appraiser determines the difference in rent revenues between the comparable properties and multiplies that difference by a gross monthly rent multiplier (GMRM) for the neighborhood of the subject property.
TECHNIQUES TO ESTIMATE ACCRUED DEPRECIATION

The appraiser has several methods or techniques to estimate the amount of accrued depreciation that affects the subject property. Each of these techniques relies on a thorough inspection of the subject property and knowledge of the market area and type of property the subject happens to be.

(a) THE AGE-LIFE METHOD - The age-life depreciation method starts with a thorough inspection of the subject property to form a judgment about the property's effective age and its remaining economic life. The appraiser uses these two judgments to calculate a ratio that represents the amount of accrued depreciation for the subject property. Effective age is the age the property appears to be as opposed to its actual or chronological age. A well maintained and recently renovated property will have an effective age that is less than its actual age. For example, the appraiser could judge a 25 year old house with little if any physical deterioration that just had a kitchen and bathroom renovation to have a five year effective age. On the other hand, the appraiser could judge a five year old home in very poor physical condition because of deferred maintenance and neglect to have a 10 year effective age. Remaining economic life is the number of years the subject property can continue to provide the benefits without the need for a major renovation of structural components and interior space. The renovations being considered are replacement of exterior surface materials other than the roof covering, bracing of load bearing walls, redesign of interior space, and total replumbing and rewiring. A newly constructed single family house typically receives an estimated remaining economic life of forty years. If an appraiser is inspecting such a house today and it is 30 years old but in excellent physical condition with no functional obsolescence, he or she could judge the house to have 40 years of remaining economic life. If the appraiser is inspecting the same house but finds it in very poor physical condition with substantial amounts of functional obsolescence, he or she could judge the house to have 12 years of remaining economic life.

The estimate for accrued depreciation is the ratio of effective age to the sum of effective age plus remaining economic life. If effective age is five years and remaining economic life is 40 years, the ratio is 5/(5+40) equal to approximately 11 percent depreciation. If on the other hand, effective age is 25 years and remaining economic life is 10 years, the ratio is 25/(25+10) equal to approximately 71 percent depreciation. The appraiser multiplies the age-life ratio times the value of the reproduction cost of the new improvement to get the estimate for dollar value of accrued depreciation.

(b) THE AGE-LIFE METHOD: DEPRECIATION RATE TABLES - The construction cost estimating services that provide the per square foot reproduction cost estimates also provide a table of age-life depreciation ratios. The appraiser judges effective age and remaining economic life for the subject property and uses these figures to find
the appropriate age-life depreciation rate in the depreciation table. Many appraisers prefer estimates based on their personal inspections to guideline rates in published tables.

(c) THE MODIFIED AGE-LIFE METHOD - The age-life method considers all components of the subject property to have the same effective age and remaining economic life. This inherent assumption is not true for both structural components that have long physical lives and fixtures that have short physical lives. Many appraisers will take this fact into consideration and calculate separate depreciation rates for the components and fixtures that have short physical lives such as the roof covering, floor coverings, wall coverings, appliances, and mechanical systems, and the components that have long physical lives such as the foundation, exterior and interior walls.

(d) THE OBSERVED CONDITION METHOD - The age-life methods for estimating accrued depreciation establish a rate that represents physical deterioration, functional obsolescence and external obsolescence by a single number. If the appraiser chooses to make separate estimates of depreciation for each of these three categories of accrued depreciation, he or she is using the observed condition method. This method includes techniques to calculate physical deterioration and functional depreciation estimates for the various physical components of the improvements, both long and short-lived and curable and incurable depreciation.

APPLICABILITY OF THE COST APPROACH

The cost approach for estimating market value requires three pieces of information—the market value of the site, the reproduction cost of a new improvement, and a dollar value for accrued depreciation. The appraiser adds the value estimate for the site to the reproduction cost of the new unit and subtracts the dollar estimate for accrued depreciation. The resultant figure is the estimate of the subject property's market value based on the cost approach. The applicability and the accuracy of the cost approach depend on the following factors:

(a) availability of market data for estimating site value,

(b) accuracy of the reproduction cost estimate,

(c) availability of data on repair costs to estimate physical deterioration, and

(d) availability of market data and the accuracy of cost data for the calculation of dollar values for functional and external obsolescence.

The age of the subject property also influences the applicability and the accuracy of the cost approach. The estimate for accrued depreciation is less accurate for an
older structure since it is more difficult to calculate functional and economic obsolescence for an older structure because of changes in standards of construction, types of construction materials, and costs of materials and labor.

A cost approach may be the best choice for a type of property that doesn’t trade regularly (such as a special purpose property), or for which an income capitalization approach is not appropriate.