THE COST APPROACH IS THE MOST RELIABLE, SCIENTIFIC AND DEMANDING APPROACH TO ESTIMATING FAIR MARKET VALUE

One occasionally hears an appraiser state that the cost approach is inapplicable to a particular improved property for one reason or another. Sometimes, such a statement says more about the appraiser than it does about the cost approach. The cost approach is, in fact, applicable to improve property almost 100% of the time. The principle reason for its nonuse or inadequate consideration can be the result of inadequacies felt on the part of the appraiser. The cost approach can be the most demanding approach to estimating fair market value.

The first difficult step is the determination of reproduction cost. There are several recognized methods for estimating reproduction costs, and the one selected will depend largely upon the degree of accuracy sought.

A quantity survey is the most accurate if accomplished by a qualified professional. Unfortunately, we in the United States have not adopted quantity surveying as a distinct licensed profession as have Canada, England and the other Commonwealth nations. A professional quantity surveyor can predict construction costs for a specific subject at a specific location with amazing accuracy. The quantity survey method requires detailed construction drawings, considerable time and analysis and can be expensive.

The second most accurate method of determining reproduction costs is an estimate by a contractor qualified to construct the subject. One might think that this method would be the most accurate, but one who has bid a project can attest that quotes can vary greatly depending upon the particular circumstances of the bidder.

The least accurate but most widely used method for determining reproduction cost is a trending index such as the Marshall Valuation Service or the State Tax Commission manual. These publications attempt to periodically report current costs of construction by geographic area generally according to a unit of measurement such as square foot. The strength of this technique lies in its ease of use and its weakness lies in the fact that it uses averages.

Determination of reproduction cost is always the first step in the cost approach analysis. Sometimes the terms "reproduction cost" and "replacement cost" are used interchangeably. They should not be. Reproduction cost is the estimated cost to reproduce the subject as it exists as of the evaluation date. Replacement cost is the cost of constructing a structure which has "utility equivalence" to the subject as of the valuation date. "Replacement cost same footprint" is the cost of reproducing the subject with those dollars associated with the form of functional obsolescence known as superadequacy removed.

The critical need for precise terminology becomes apparent when one encounters an appraisal technique wherein a "replacement model" is employed. The replacement model technique attempts to measure all forms of functional obsolescence not just superadequacy in the first stage of the appraisal process while cost is being developed. The appropriate use of the "replacement model" technique is so limited that we would probably be better off if it never existed. Failure to be precise in the application of the terms "reproduction cost" and "replacement cost" and failure to insist that determination of reproduction cost is the first step in every appraisal, can lead to confusion and to the notion that the cost approach is somehow mysterious.
The second most difficult and even more demanding step in a cost approach analysis is measurement of depreciation. One should always remember that the depreciation calculation is market oriented. Depreciation is the measure of buyer resistance caused by inadequacy, superadequacy and deterioration. If one includes superadequacy (which one should), depreciation exists in six forms: physical curable, physical incurable, functional superadequacy, functional obsolescence curable, functional obsolescence incurable and external obsolescence. Each form of depreciation needs to be analyzed separately by the appraiser who must put himself or herself in the shoes of a knowledgeable seller and a knowledgeable buyer and measure it as they would.

Physical curable depreciation consists mainly of fix-ups which add to value not less than the amount of their cost; repair of the parking lot or replacement of a window for example. Physical incurable depreciation is principally related to loss in value due to age.

Market value loss caused by physical deterioration curable and incurable is widely understood and relatively straightforward. The error that one frequently falls into, however, is failure to distinguish between the physical life of a structure and the economic life of a structure. Economic life is the principle concern of the marketplace. The marketplace is concerned with how much of the economic life has been lived and how much remains. This may be something entirely different than the question how long will the structure physically stand.

Functional obsolescence is loss in value due to superadequacy or inutility. The form of functional obsolescence known as superadequacy is usually accounted for during the first stage of the appraisal process when reproduction cost is determined. Most often, the superadequacy is caused by new technology. For example, computer-aided design allows for more exact measurements of the amount of steel required for the structural load in a steel-supported building. The excess pounds existing in an older building is something a purchaser considering a substitute versus the subject would typically not be willing to pay for. An industrial building served by an indoor rail dock in an industry which has switched to truck transport could experience a rail dock superadequacy. Great caution needs to be exercised in this calculation, however, as it is all too easy for one to declare some portion of a building (apparent excess square foot area, for example) as super-adequate and valueless. One must recognize that a building component which is so lacking in utility that it would not be constructed new does not necessarily mean that it has absolutely no value. The fact that someone could reasonably use the component means that it has some utility and, therefore, some value and must be included in reproduction cost.

Calculation of loss in market value due to functional obsolescence curable and incurable is difficult and not well understood. It may be helpful to recognize that there appear to be three-value loss measurement problems caused by functional obsolescence. They can be labeled 1) remove a component; 2) replace a component; and 3) augment with a component.

Remove a Component. There are times when a building component makes no contribution to value and its existence causes an operating cost penalty. A knowledgeable buyer would consider removing the component and the knowledgeable seller would expect the buyer to do so. If the cost associated with removing it is greater than the operating cost penalty, then the parties would deduct the cost of the penalty from the sales price. If the operating cost penalty is greater than the cost of removing the building component, then the following two items must be deducted from reproduction cost as the knowledgeable buyer and seller would: a) subtract from reproduction cost the existing depreciated value of the old component; and, b) subtract the expenditure necessary to remove the old component.
Replace a Component. There are times when a new structural component can replace entirely an old structural component which will enable the subject to produce future operating cost benefits the present worth of which exceeds the cost of the new component plus the following costs which must then be deducted from sale price just as they would be in the minds of a knowledgeable buyer and seller: a) subtract from reproduction cost the existing depreciated value of the old component (but add back salvage value, if any); b) subtract the expenditure necessary to remove the old component; and, c) subtract the added cost which will be incurred due to constructing the new component as of the date of appraisal rather than as of the date of the original construction. (Presumably if the new component had been constructed at the time the subject was built, it would cost less to incorporate in the subject, and therefore, the excess cost associated with adding it later must be deducted.)

Augment With a Component. There are times where none of the existing building components of the subject are being removed because they continue to have some utility, and therefore, value. If, however, a new component is added or if an existing building component is enhanced or augmented, there will be future benefits the present worth of which will exceed the cost of the addition plus the following cost which must be deducted from value: a) subtract the added cost which will be incurred due to constructing the new component as of the date of appraisal rather than as of the date of the original construction.


Note that one does not deduct the cost of acquiring the replacement, enhancement or augmentation for the simple reason that this cost is not part of a hypothetical transaction between the knowledgeable buyer and seller. After all, one contemplating the purchase of vacant land for construction of a building does not subtract the anticipated cost of the building from the fair market value of the land.

The techniques for measuring market value influence caused by external obsolescence are given wide lip service and are widely ignored. The techniques are paired sales or paired rents. The appraiser is supposed to determine a sales price or rent deficiency resulting from economic forces external to the property. In practice, however, the appraiser generally has insufficient, empirical data for either a paired sales or rent analysis and frequently calculates an external obsolescence deduction expressed as a percentage and only thinly disguised as a guess. The validity of this guess is generally as good as the experience and intuition of the appraiser. One occasionally sees, however, elaborate calculations of external obsolescence which bear close scrutiny so as not to trap the unwary. This writer first observed one such phenomenon in 1977 in the case of Consumers Power Company v Port Sheldon Township, MTT Docket No. 15308, 91 Mich App 180 (1979) and again in 1992 in a slightly modified version in a subsidized housing tax appeal. In both cases, the elaborate calculation of external obsolescence converted what purported to be a cost approach analysis into an income approach analysis. In the 1977 appraisal, the value estimate concerned the entire operating properties of major utility. One of the external obsolescence calculations appeared at page 21 of Exhibit P-6 as follows:
Cost Approach at 12-31-76

Original Cost of Utility Plant (MPSC Form 1 - Page 110, Line 2) $3,332,389,464
Construction Work in Progress (MPSC Form 1 - Page 110, Line 3) $ 618,022,221

Total Utility Plant (MPSC Form 1 - Page 110 - Line 4) $3,940,411,685

Less: Accumulated Provision for Depr., Amort. and Depletion
(MPSC Form 1 - Page 110, Line 5) $ 858,457,007

Net Utility Plant, Less Nuclear Fuel (MPSC Form 1 - Page 110, Line 6) $3,081,954,678

Nuclear Fuel (MPSC Form 1 - Page 110 - Line 7) $ 26,058,094

Less: Accumulated Provision for Amortization of Nuclear Fuel
Assemblies (MPSC Form 1 - Page 110 - Line 8) $ 6,487,492

Net Nuclear Fuel (MPSC Form 1 - Page 110 - Line 9) $ 19,570,602

Net Utility Plant (MPSC Form 1 - Page 110 - Line 10) $3,101,525,280

Add: Materials and Supplies (MPSC Form 1 - Page 110, Line 26) $ 114,673,152

System Value as Indicated by Cost Approach $3,216,198,432

Less: Obsolescence (See Note Below) $ 777,385,093

System Value as of 12-31-76 as Indicated by Cost Approach Say $2,438,813,339

$2,439,000,000

Note: The usual procedure for measuring obsolescence is to capitalize the loss in income arising therefrom. In this particular instance, the functional obsolescence arises from changes in technology, and economic obsolescence arises from lack of gas supply and from regulatory lag in permitting adequate return on investment. The loss in income and the obsolescence indicated thereby is as follows:

Net Utility Plant Including Material & Supplies $3,216,198,432
Proper Rate of Return (See Income Approach) 10.25%
Net Return Consumers Power Should Have Earned $ 329,660,339
Actual 1976 Net Utility Operating Income $211,970,000
Add: Income Attributable to Constr. Work in Progress ($618,022,221 x 10.25% x 60%) $ 38,008,367 $ 249,978,367
Indicated Deficiency in Income Capitalized at 10.25%
Indicated Obsolescence $ 777,385,093
On first review, the calculations appear impressive. On closer scrutiny, however, a troubling fact emerged. There appeared to be no correlation between cost and the final value estimate. If for example one increased the depreciated reproduction cost 100% or decreased it 50%, the final value estimate nonetheless remained unchanged.

<table>
<thead>
<tr>
<th>Use 100% Increase In System Value</th>
<th>Use 50% Decrease In System Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,432,396,864</td>
<td>1,608,099,216</td>
</tr>
<tr>
<td>3,993,583,532</td>
<td>(830,714,117)</td>
</tr>
<tr>
<td><strong>Value Estimate:</strong></td>
<td></td>
</tr>
<tr>
<td>2,438,813,332</td>
<td>2,439,000,000</td>
</tr>
<tr>
<td>2,439,000,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6,432,396,864</th>
<th>1,608,099,216</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.25%</td>
<td>10.25%</td>
</tr>
<tr>
<td>659,320,679</td>
<td>164,830,170</td>
</tr>
<tr>
<td>211,970,000</td>
<td>211,970,000</td>
</tr>
<tr>
<td>38,008,367</td>
<td>38,008,367</td>
</tr>
<tr>
<td>249,978,367</td>
<td>249,978,367</td>
</tr>
<tr>
<td>409,342,312</td>
<td>(85,148,197)</td>
</tr>
<tr>
<td>10.25%</td>
<td>10.25%</td>
</tr>
<tr>
<td>3,993,583,532</td>
<td>(830,714,117)</td>
</tr>
</tbody>
</table>
By analyzing the calculations algebraically one can see what happened.

COST APPROACH AT DECEMBER 31, 1976

STATED ALGEBRAICALLY

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Value As Indicated By Cost Approach</td>
<td>$3,216,198,432</td>
<td>A</td>
</tr>
<tr>
<td><strong>Less:</strong> Obsolescence (As Computed Below)</td>
<td><strong>777,385,093</strong></td>
<td>B</td>
</tr>
<tr>
<td>System Value As of December 31, 1976, as Indicated By Cost Approach</td>
<td><strong>$2,438,813,339</strong></td>
<td>C</td>
</tr>
<tr>
<td>Net Utility Plant Including Material and Supplies</td>
<td>$3,216,198,432</td>
<td>A</td>
</tr>
<tr>
<td>Proper Rate of Return (See Income Approach)</td>
<td>10.25%</td>
<td>R</td>
</tr>
<tr>
<td>Net Return Consumers Power Should Have Earned</td>
<td>$329,660,339</td>
<td>F</td>
</tr>
<tr>
<td>Actual 1976 Net Utility Operating Income</td>
<td>$211,970,000</td>
<td></td>
</tr>
<tr>
<td><strong>Add:</strong> Income Attributable To Construction Work In Progress ($618,022,221 x 10.25% x 60%)</td>
<td>38,008,367</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$249,978,367</strong></td>
<td>G</td>
</tr>
<tr>
<td>Indicated Deficiency In Income</td>
<td>$79,681,972</td>
<td>E</td>
</tr>
<tr>
<td><strong>Capitalized At</strong></td>
<td>10.25%</td>
<td>R</td>
</tr>
<tr>
<td><strong>Indicated Obsolescence</strong> (As Above)</td>
<td><strong>$777,385,093</strong></td>
<td>B</td>
</tr>
</tbody>
</table>
Here is what happened!

1. \( C = A - B \)  
   \[ $2,438,813,339 = $3,216,198,432 - $777,385,093 \]

2. \( B = E + R \)  
   \[ $777,385,093 = 79,681,972 \div .1025 \]
   \( B = (F-G) \div R \)  
   \[ $777,385,093 = (329,660,339 - 249,978,367) \div .1025 \]

3. \( F = A \times R \)  
   \[ $329,660,339 = 3,216,198,432 \times .1025 \]

4. \( B = (A \times R-G) \div R \)  
   \[ $777,385,093 = ((3,216,198,432 \times .1025) - 249,978,367) \div .1025 \]

5. \( C = A - ((A \times R-G) \div R) \)  
   \[ $2,438,813,339 = 3,216,198,432 - 3,216,198,432 \times .1025 - (249,978,367 \div .1025) \]
   \[ $2,438,813,339 = 3,216,198,432 - 3,216,198,432 \times (.1025 \div .1025) + (249,978,367 \div .1025) \]

(5) As Reduced

6. \( C = G \div R \)  
   \[ $2,438,813,339 = \text{System Value} \]
   \[ \text{December 31, 1976} = (\text{Adj. 1976 Operating Income} \div \text{Income Approach Proper Rate of Return}) \]

Conclusion: System Value as indicated by cost is not used! It drops out in #5. The final formula denotes the "INCOME APPROACH" not a "COST APPROACH" as evidenced by the final formula:

\[ \text{System Value at 12/31/76} = (\text{Adj. 1976 Operating Income} \div \text{Proper Rate of Return}) \]
\[ C = G \div R \]
\[ $2,438,813,339 = $249,978,367 \div .1025 \]

I trouble you with this analysis because although the method was not adopted by the Tribunal in 1977, it has recently been utilized in an appraisal prepared for a 1992 Tribunal hearing. Because the Michigan Supreme Court has mandated use of at least the three traditional approaches to value in every appraisal it is possible that we will see this and similar types of calculations utilized in the future in an attempt to bend the more rigorous elements of the cost approach to reach the conclusions of the less rigorous and more subjective income and sales comparison approaches.

The cost approach is probably the most reliable but also the most rigorous approach to estimating fair market value. Careful examination of a cost approach analysis can sometimes reveal a great deal about the capabilities of the appraiser. A carefully prepared cost approach analysis will reveal the fair market value of the subject.

-Richard D. Reed