Floodplain Manager's Notebook
MARKET VALUE SUPPLEMENT

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A COOL TOOL: Physical Life Calculator

There are some great tools available that appraisers use to estimate Actual Cash Value (ACV). An essential element of ACV appraisals is an estimate of physical depreciation, and the core of physical depreciation estimates is a forecast of building physical life. I recommend that appraisers learn about and use the Physical Life Calculator tool developed by Professor Craig Langston of Bond University, Queensland, Australia. I know of no other tool like it.

Physical Life

Appraisers define "physical life" as:

1. An estimate of how old a building or improvement will be when it is worn out.
2. The total period a building lasts or is expected to last, as opposed to its economic life.

ACV appraisal reports developed using the Physical Life Calculator tool help floodplain administrators because:

- SI/SD appraisal review time is reduced.
- The building value will be the best allowable for the people involved.
- The depreciation estimate is scientifically supported and documented.
- Depreciation estimates will be building-specific and logically consistent.
- Depreciation estimates will meet SI/SD Desk Reference and USPAP requirements.

Physical Depreciation

Section 4.5.3 of the FEMA *Substantial Improvement/Substantial Damage Desk Reference* (FEMA P-758) says that for ACV, the depreciation deduction is only about the physical condition of the building. Obsolescence, whether functional (building design/desirability) or external (factors outside the building), is not recognized.

The process appraisers normally follow requires an estimate of total depreciation including physical deterioration and obsolescence. Standardized form reports appraisers use to estimate whole-property market value employ effective age/economic life concepts to develop depreciation estimates including both physical deterioration and obsolescence. This means limiting the discussion to physical deterioration can be confusing.

The SI/SD Desk Reference describes physical depreciation as loss of building value due to age, use, and neglect. Age and use is the same as wear and tear. All parts of a building deteriorate or wear out, some more quickly than others. Building components like concrete foundations, subfloor materials, internal framing, piping, and wiring age slowly and are seldom replaced. Exterior finishes like siding, paint, and roof covers, and mechanical equipment, wear out more quickly and are replaced more often. Interior finishes are usually renewed before they wear out because styles and owner desires change.

Because building components wear out at different rates, and some components can be replaced or renewed, physical depreciation does not plot as a straight line on a graph of depreciation over time. Under a program of good property management, the graph of percentage physical depreciation plots at a rate higher than the

straight-line average, but periodically resets to a lower level of accumulated depreciation as major components like roofs, air conditioners, and the like are replaced.

Neglect is the same as bad property management. Appraisers call this deferred maintenance. Deferred maintenance is wear and tear that should be fixed right away to protect property value or to enhance property utility. When a building is not properly maintained, total depreciation increases and will graph above the long-term average rate of depreciation.

Options for Estimating Physical Depreciation

When appraisal reports that include estimates of physical depreciation are submitted with permit applications, local officials should ask what method was used to make those estimates. First I'll describe some options and their drawbacks, then I'll tell you what I recommend.

Guesswork: Not reliable, not supportable, and not compliant.

Published Tables: The SI/SD Desk Reference suggests there are published tables where the percentage of building depreciation can be referenced. Most published cost services compile tables of building economic life expectancy. Marshall Valuation Service is a good example. The depreciation tables are labeled "Effective Age" and "Typical Life Expectancy." The tables are said to be appraiser estimates, but they are about economic life, not physical life. Using tables like these is not appropriate for analysis of the ACV physical depreciation problem.

Logical Estimates: Building physical life is usually longer than economic life, so we can assume that physical life will be greater than the economic life projections published by cost services. That would imply a typical building physical life of something more than 65 years. Another consideration is what we know by observation. Most communities have examples of buildings more than 100 years old. In New England and elsewhere we find buildings more than 200 years old, and throughout Europe even older buildings are still in use. Reasoning from observation is sound, but the logical estimate method is difficult to apply to a specific building, and even harder to support differences between buildings.

Analysis Approach: Analysis of physical depreciation starts with a forecast of building physical life. An analysis of physical life answers the question, "If this building was properly designed, properly constructed, and properly maintained, how long would it stand?" If we know a building's actual age and we can forecast its physical life, then we can calculate the total straight-line percentage of physical depreciation at any time. If the property is neglected and there is deferred maintenance, then to obtain the amount of total depreciation, the cost to correct the deferred maintenance must be added to the straight-line dollar amount.

My Recommendation: The analysis approach is best for estimating physical depreciation because:

- Building physical life is forecast objectively using a physical life calculator tool.
- The physical life forecast applies to the specific building under analysis.
- The calculator tool output page is appropriate for inclusion in an appraisal report.
- The process accounts for deferred maintenance.

Professor Langston's Physical Life Calculator epitomizes the analysis approach. The algorithm used in the calculator assumes a base building life of 100 years, and then adds or deducts points (years) according to the responses to questions. Some conservatism is applied to the estimate and the forecast is rounded down to one of the following outcomes: 25, 50, 75, 100, 150, 200, 250 or 300 years. The calculator is unsuitable for temporary structures and for highly unusual or unique buildings, both of which require specialist judgment.

I discovered Professor Langston, his conference paper, and the Physical Life Calculator in 2014 after wrestling with appraisal of a 109-year old building. This tool is a must for developing reliable ACV estimates. The calculator tool, and other resources for appraisers, floodplain administrators, and the public, are available here.

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