

Useful Limitations: Quantifying Functional Obsolescence

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In the cost approach, the process of identifying functional obsolescence begins with an analysis of the industrial property being appraised and its operating capabilities in comparison with a modern replacement. This paper will address functional obsolescence issues that impact the market value of industrial improvements and industrial personal property. The paper will also discuss how to analyze and incorporate these functional obsolescence issues into the valuation of industrial property.

Overview ¹

The American Society of Appraisers describes *functional obsolescence* as a form of depreciation resulting in a loss in value or usefulness of a property caused by inefficiencies or inadequacies of the property itself, when compared to a more efficient or less costly replacement property that new technology has developed. Symptoms suggesting the presence of functional obsolescence are excess operating cost (the present worth of future excess operating expenses), excess construction, over-capacity, inadequacy, lack of utility or similar conditions.

Functional obsolescence from excess capital is the loss in value from the difference between the reproduction cost new and the replacement cost new of the subject property. This loss in value is the result of technological advances and the development of better construction materials and methods.

Functional obsolescence from excess operating expenses is caused by excess operating or manufacturing expenses. It is quantified by the capitalization of excess operating expenses associated with the subject property compared to a modern replacement. The types of operating expenses that should be investigated for the existence of operating obsolescence are operating labor, maintenance labor and materials, operating supplies and chemicals, raw material costs, energy and utilities, scrap and production yields.

Functional obsolescence, particularly excess operating expenses obsolescence, is typically found in the following situations:

- Plants involved in the process industries
- Plants involved in industries that either use assets or manufacture products with a high degree of technology
- Older plants that have increased in size over time

¹ Valuing Machinery and Equipment: The Fundamentals of Appraising Machinery and Technical Assets (2005). American Society of Appraisers, Washington, DC.

- Plants in which there are a number of identical units
- Plants involved in industries that handle large volumes of material; and
- Plants with areas of inactive machinery

Functional obsolescence can be either curable or incurable. If the cost to cure the functional obsolescence is equal to or less than the anticipated cost of enduring the deficiency, the functional obsolescence is judged to be curable. Generally, excess capital is a form of incurable functional obsolescence because the cost to eliminate these forms of obsolescence exceeds any increase in value the asset may bring in exchange in the market.

Effects on Ad Valorem Tax Appraisals for Industrial Properties

Functional obsolescence is either a physical element that buyers are unwilling to pay for or a deficiency that impairs the utility of a property when compared with a modern replacement. It represents an item in the property that buyers consider to be of no value or to be a negative element in a property. In other words, functional obsolescence is a penalty against the property.

Most frequently, functional obsolescence is associated with the cost approach. Tenets of functional obsolescence, comparative disadvantages in a property's design or capacity are relevant to cost, sales and income approaches to valuation. The following sections address how functional obsolescence impacts the three approaches to value.

Cost Approach

In the cost approach, the cost new must be reduced to reflect physical deterioration, functional obsolescence, and economic obsolescence attributable to the subject property. All components of depreciation and obsolescence must be quantified to result in the cost indicator of value. The identification and quantification of functional obsolescence requires the application of a detailed cost approach.

Income Approach

When applicable, the income approach estimates future revenues, operating expenses, capital requirements and working capital changes. The resulting net cash flow is then discounted to present value to determine the value of the business enterprise. Functional obsolescence impacts the income approach to value in the following ways:

- Increases in operating expenses due to inefficient infrastructure;
- Increases in operating expenses due to excess infrastructure in place; and
- Future capital cost to correct design deficiencies.

Sales Comparison Approach

The sales comparison approach is used to establish value through an analysis of recent transactions of comparable properties. Actual sales are analyzed and adjusted to reflect differences in size or capacity, market conditions, age, condition of improvements and location between the subject and the market comparables. Ideally, the comparable sales have the same or similar forms of functional obsolescence, which prevents the need to make significant

adjustments. However, adjustments for functional obsolescence are often necessary. These adjustments can be quantified by developing specific functional obsolescence penalties, which are then used in the derivation of an adjustment to be applied to the market comparables.

Application of Useful Limitations

To achieve property tax savings from functional obsolescence deductions, property tax specialists must make viable, quantitative analyses of factors like reproduction versus replacement costs, technological disadvantages, and inefficiencies, and then they must present the results to assessors in a convincing approach. Application for useful limitations for industrial properties involves indentifying and quantifying each form of observed obsolescence in a step-by-step process.

Identifying Functional Obsolescence

It is important to know those attributes of the subject property that the market perceives as desirable or undesirable for the cost approach in general and functional obsolescence in particular. The significant attributes of a property are those that identify its physical capabilities. For industrial property, this includes capacity, unit configuration, number of production lines, labor requirements, overall construction design, and materials of construction.

Although functional obsolescence may be present in every aspect of the manufacturing process, it may not be readily visible without in depth discussions with knowledgeable facility personnel. With more frequent technology advances and the move toward global industrial competition, facilities, especially older sites, may have more functional obsolescence than in the past.

One way to define these attributes is to ask questions, the answers to which may narrow the data needed to quantify the impact of functional obsolescence. Talk to facility personnel such as the facility or plant manager or maintenance personnel. Speak with an engineer who has been at the facility for a number of years. Remember the facility's *USE - Utility, Situs, Extra* as compared to a modern facility, for instance:

U for Utility –

- Physically inspect the subject property with the plant manager and have them identify any deficiencies. Look for inefficiencies or bottlenecks, since these may indicate an inefficient operation or a form of superadequate construction.
- Have there been major advances in areas like technology, utilities, etc., which would give industrial competition the advantage?
- Does the subject plant have many small units, vessels, or product lines for which a modern plant would have fewer, larger units, vessels, or lines?
- Are there manual operations for which a modern facility would have automation?
- Has equipment developed operational problems?
- Have units been abandoned, idled, or utility decreased?
- Has the “cost to cure” deficiencies already been estimated by the technical staff?

S for Situs –

- Is the facility well-placed in regard to raw materials gathering and product distribution?

- Are there restrictions on transportation, in regard to water, rail, pipeline, that would cause the use of many (smaller) truck transports?
- Is the facility design laid out in an efficient manner as compared to a modern facility?
- Would a modern plant have the same equipment
- Do interim steps require superfluous movement of material?

E for Extra questions –

- Are there any features about the facility that would be modified or removed in a modern facility?
- Ask plant personnel if they have performed any benchmarking studies, maintenance studies, plant evaluation reports, environmental studies, long-range studies, or any other types of reports summarizing the capacities, sizes, and uses of the property. Such studies can help to identify inefficient physical attributes of the subject property as well as market illustrations of more desirable facility attributes or operations.

The responses to the above questions should indicate the issues of functional obsolescence inherent in the subject property. The next step is determining how these functional obsolescence issues impact the market value of the subject property.

Quantifying Functional Obsolescence

Once forms of functional obsolescence present in the subject property have been identified, the next step is quantifying the obsolescence.

The appraiser begins this phase of the analysis by breaking the problem down into its most basic elements, by:

- Comparing the appraised property to the modern replacement that is currently desired in today's market.
- Turning to outside specialists when necessary. For example, an engineer or contractor can be consulted to learn about current design and construction standards in the industry.
- Looking for current market examples that serve to illustrate market preferences.

If the inefficiency is operationally related and hence an excess operating expense, the following steps measure the obsolescence:

- With the assistance of knowledgeable plant personnel, identify each phase of the operation.
- Identify the labor, material, operating expenses and equipment costs for each element of the operation.
- Compare each phase of the operation to the modern replacement.
- Determine the total annual excess cost by deducting the total annual cost of operations in the modern replacement from the total annual cost of the existing operation.
- When appropriate, reduce the excess operating cost by the marginal tax rate to reflect the impact of income taxes on the resulting incremental profit.
- Estimate the remaining life of the item causing the excess operating cost.

- Determine an appropriate discount rate used for quantifying excess operating expense obsolescence.
- Calculate the present value of the excess operating cost over the remaining life of the deficiency to arrive at an indication of the functional obsolescence.

Cost Approach to Value

After developing the cost new and quantifying each of the various elements of depreciation, the final step in accounting for functional obsolescence is deducting each element of depreciation from the cost new to arrive at the cost indicator of value.

Reproduction Cost New
 Less: Functional obsolescence due to excess capital cost
 Equals: Replacement Cost New
 Less: Incurable physical deterioration
 Less: Economic obsolescence
 Less: Incurable functional obsolescence due to excess operating expenses
 Less: Curable physical deterioration
 Less: Curable functional obsolescence
 Less: Necessary capital expenditures
 Plus: Land
 Equals: Cost approach indicator of value

Conclusion

The investigation and consideration of functional obsolescence is a required procedure in the cost approach to value. In most cases, the assessor's valuation fails to identify and quantify all forms of functional obsolescence associated with industrial improvements and industrial personal property. It is important to continue monitoring industrial properties for indicators of functional obsolescence and quantify the market value impact of these deficiencies.