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Inutility Penalties

Robert Svoboda PE, ASA
Director
Deloitte Financial Advisory Services LLP
Suite 4500
1111 Bagby Street
Houston, Texas 77002-4196
(713) 982-4756

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Inutility Defined

- How do the Appraisal Societies Define Inutility

  ASA defines inutility:

  – "Whenever the operating level of an asset or an entire plant is significantly less than its rated or design capability, and the condition is expected to exist for some time, the asset is less valuable than it would otherwise be. Such a penalty for inutility can be a measure of the loss from this form of economic obsolescence." (Valuing Machinery & Equipment, Second Edition, p 97)

Background

- An Inutility Penalty used within the Cost Approach is Based on the Cost-to-Capacity Relationship:

$$\frac{\text{Cost A}}{\text{Cost B}} = \left(\frac{\text{Capacity A}}{\text{Capacity B}} \right)^{x}$$

Where: x = Scale Factor

Background (cont.)

- The equation indicates that there is an **exponential** relationship between cost and capacity.
- When first derived, the equation was referred to as the **"Sixth-Tenths" Factor** as the bulk of the exponents were close to 0.6
  - 35 plants analyzed by C.H. Chilton
  - Exponents ranged from 0.33 – 1.02

Scale Factors / Exponents

- Various sources for exponents. Two most commonly quoted:
  - Plant Design and Economics for Chemical Engineers (Peters, Timmerhaus)
  - Process Plant Estimating, Evaluation and Control (K.M. Guthrie)

Scale Factors / Exponents (cont.)

- Develop Your Own:
  - Go to any cost estimating resource and plug in cost and capacity and solve for the exponent.

$$\frac{\text{Cost A}}{\text{Cost B}} = \left(\frac{\text{Capacity A}}{\text{Capacity B}} \right)^{x}$$

  - Use the formula to test published exponents when data is available.

Scale Factors / Exponents (cont.)

Sample Exponents

Asset	Exponent	
	Low	High
Industrial Fans and Blowers	< 0.5	> 1.0
Tanks	0.4	
Heat Exchangers	0.4	0.6
Chemical Process Plants	< 0.5	0.8 +

Scale Factors / Exponents (cont.)

- When Reliable Exponents are not available, there are no easy answers, but….
  - Look to Other Comparable Construction Attributes
    - i.e., an ethylene plant (exponent = approx. 0.8) requires large furnaces, which may be comparable to a blast furnace in a steel mill or a furnace in a glass plant
  - Develop your own from whatever data is available
    - Pricing Sources
    - Cost Curves

Defining Capacity

- The amount that can be contained (i.e., a tank filled to capacity)
- The capability of an asset or a plant to produce products. Typically measured as a rate – a quantity over time (i.e., lbs/hr, tons/yrs, etc.)

Defining Capacity Examples

- Buildings – Square feet, Cubic feet
- Steel Mills – Tons/year
- Oil Refinery – Barrels (of input) per day
  - Calendar Day
  - Stream Day
- Batch Plants – tons/hr
- Machine Tools – thousand man hours
- Bakeries – loaves or buns/hr

Defining Capacity

- Defining Capacity on an Annual Basis for "Non-Process" Plants can be Difficult
  - Buildings
  - Machine shops
  - Custom Fabricators
  - Batch plants
  - Assets operating on a Seasonal or Peaking Basis

Defining Capacity

- Illustrating “Annualized” Production
  - Generic Plant is capable of operating at 100 tons/hr
    - If the plant operates at 40 hrs per week over 50 weeks, annualized capacity is 200,000 tons/year. But….
    - If the plant only operates 25 weeks out of the year running two 10–hr shifts per day over 6 days per week, annualized capacity is 300,000 tons/year.

Defining Capacity

- What is the Capacity of the Plant in the previous example?
  - Answer: 100 tons/hr
- What is the Annualized Capacity?
  - Depends
    - 200,000 tpy or
    - 300,000 tpy

Defining Capacity

- So, for Valuation Purposes, Look at the Historical Annual Production to determine capacity
  - May Use Peak Production as the Annualized capacity
    - Single year
    - Average of 2 or 3 years
    - Answer is a function of facts and circumstances.

Defining Capacity

- The key in answering the “Capacity” question is to consider the environment in which the assets operate.
  - In the preceding example, the 100 ton/hr facility is presumed to be operating operate at it highest & best use and maximally productive.
    - The operating level at the asset’s highest and best use establishes the annual capacity and can be used to measure economic obsolescence.

Inutility Penalty

- When Used in Calculating Obsolescence, the Cost-to-Capacity Formula is restated as:

$$Inutility\ (\%) = \left[1 - \left(\frac{ActualProduction}{RatedCapacity} \right)^{x} \right] \quad x \quad 100$$

Inutility Penalty Application

- Applied to assets that are not fully utilized
  - Most common usage is to calculate economic obsolescence for assets that are not operating at full capacity.
  - Logic behind inutility penalties is to “balance” the capacity and the investment.
- Use of the penalty typically assumes that the reduced operating level is static, but in property taxation, inutility penalties can be adjusted if and when operating levels changes.

Inutility Penalty
Strengths and Weaknesses

- Strengths
  - Useful tool within the cost approach especially when no other measures are available.
  - Objective – based on the cost estimating tool of Cost-to-Capacity relationship
  - Strong indicator of obsolescence when reduced capacity is long-term

- Weaknesses
  - May not be applicable if the reduced operating level is temporary.
  - Margin of error increases as capacity ratios increase

Inutility Penalty

Dealing with Temporarily Reduced Operating Levels

- Assume that the reduced operating level is from economic reasons

- Question: How does the inutility penalty apply when operating levels are temporary?
  - Accounting Literature provides some guidance.

Inutility Penalty

1. For impairment testing for financial accounting purposes under US GAAP (i.e., SFAS 144) the appraiser should use the expected near-term operating level instead of the current operating level to calculate an inutility penalty. The reason is that once an asset is impaired, it cannot be adjusted upward if capacity returns to normal levels.

   – Note 1: Impairment testing under SFAS 144 is typically a cash flow analysis. Occasionally, inutility penalties are used to adjust fair value of selected assets within a reporting unit or when financial data is not available.

   – Note 2: For Property Taxation, Inutility penalties are often adjusted if and when capacity changes.

Inutility Penalty

2. For impairment testing under International Financial Reporting Standards (IFRS) and International Accounting Standard 36 (IAS36) impairment losses are reversible. Under this standard, an impaired asset can be increased if facts and circumstances warrant.
   - Using this logic, the appraiser may consider the reduced operating level to calculate an inutility penalty today and adjust value upward in future periods if capacity increases.

Bonus Slide
Notes on Impairment Testing

- Accounting standards require that companies test fair values periodically
  - SFAS 142 – Goodwill
  - SFAS 144 – Long-Lived Assets
- If goodwill is impaired, the carrying value of tangible assets is not impacted.
- The financial test under SFAS 144 is a "pre-tax" cash flow analysis. If the pre-tax cash flows exceed the carrying value, no impairment is required for financial accounting purposes.
  - However, this does not mean that the tangible assets do not suffer from obsolescence. In some cases when pre-tax cash flows indicate no impairment, an after-tax DCF yields fair value below carrying value, indicating some obsolescence.

Inutility Penalty

3. For Property Tax Purposes, inutility penalties may be calculated using the reduced operating levels as long as the calculations reflect expected future operating levels.
   - When an asset operates at suboptimal levels, cash flow is reduced and therefore the value of the asset is reduced.
4. If and when market conditions change, the inutility penalty can and should be adjusted in future tax years.
   - This is also consistent with the logic behind IFRS standards

Inutility Penalty

5. Whenever an inutility penalty is calculated, it is preferred that other valuation measures validate the inutility penalty if data is available.
   - Compare the indicated value to value indicated by the sales comparison approach.
   - Consider an income approach to support the results. However, financial data may not be available……
     - Income may be not be separable between asset classes – i.e., intangibles such as favorable contracts or customer relationships
     - Many multinational companies operate facilities as cost centers and do not recognize revenue at a plant or asset level.

Abusing Inutility Penalties

- Improper or Unsupportable Capacities
- Improper Exponents
  - Linear (exponent = 1.0) is commonly used, but often unsupported
- Assumption that the reduced operating level is permanent without support
  - Changes in market conditions may increase capacity and therefore affect future valuations.

Inutility Conclusions

- The inutility formula is a useful tool to measure economic obsolescence for assets that are not fully utilized
  - It is an objective tool based on the cost estimating tool known as the Cost-to-Capacity relationship;
  - The logic behind inutility penalties is to “balance” the capacity and the investment; and
  - For property taxation, inutility penalties are often adjusted when facts and circumstances warrant.

Questions