Valuation Guide

Grain Elevators

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Definition of Terms

Annex: A structure used to store grain. Generally constructed with heavy concrete foundations and wood, metal, or concrete walls, the annex is located adjacent to the elevator and is filled from the top by spout or conveyor from the elevator. Annexes empty from the bottom by conveyor or auger back to the elevator.

Elevator: Property designed to receive, weigh, elevate, store, and transfer to railway cars grain produced by farmers. Elevator buildings can be constructed of wood, metal, and/or concrete, and they can contain both working spaces and storage areas.

Grain Cleaning: The process of separating impurities from grain by methods such as screening. This process is found infrequently in older elevators It is a more common feature of newer elevators.

Grain Drying: The process of drying wet grains prior to storage and shipping. Drying is only required when grains are received wet and could be stored for long periods. Relatively few elevators have drying capabilities.

Twin: Generally an old elevator that has been converted to a grain storage facility. A twin may contain some elevating equipment, but it does not perform the prime elevating function at the grain elevator facility.

Grain Elevator Valuation Guide

1.0 Introduction

Grain elevators are special purpose properties designed for limited uses centering around grain handling (elevating) and storage. Some facilities also incorporate one or more grain processing activities such as cleaning, drying, and mixing. In addition, a number of grain elevators have retail farm supply centres.

Elevators are distinguished by their storage capacity, that is by the amount and variety of grain they can process or throughput. Due to the nature of their design, construction, and location, grain elevator properties provide little utility and little value for alternate uses. The value of such facilities, therefore, rests upon the economic viability of the grain business and the competition for that business.

The grain industry is dominated by large "players", which tends to limit market activity in grain elevator properties. In addition, grain elevators are seldom leased and rarely sell - except for nominal amounts at the end of their economic life. The nature of the industry thus serves to limit the approaches that can be taken in the valuation of grain elevator properties.

1.1 Types of Grain Elevators Covered in This Guide

All facilities where the primary purpose is to receive, elevate, and store various types of grain are covered in this valuation guide.

> The methods presented here may be applicable to other types of properties, but the material in this valuation guide does not directly address any type of property other than grain elevators.

1.2 Scope of Valuation Guide

This valuation guide is designed as an aid in the valuation of grain elevator properties for assessment purposes.

It sets out a cost approach procedure to derive grain elevator market values.

With the accompanying spreadsheets, the valuation guide provides a practical tool to evaluate and determine these market values.

Cost models and other valuation parameters will provide the guidelines and controls needed to establish statistically sound values.

The valuation guide is designed as a tool to aid the assessor; it is not intended to replace the assessor's judgment in the valuation process.

The method presented in this valuation guide is aimed at deriving values for a number of different models of grain elevators with typical attributes and a variety of conditions.

1.3 Background

The primary function of a grain elevator is to accumulate grains for temporary storage before transshipment to market. The value of the facility is, therefore, related to the amount of grain stored and processed. Traditionally, elevators raise revenues from three sources:

Receiving, elevating, and shipping grains to market,

Storage of grains, and

Retail activities.

Modern prairie facilities are beginning to incorporate additional revenue generating functions before shipment or storage, as follows:

Mixing grains,

Cleaning grains, and

Drying grains.

Typically, storage fees account for a smaller portion of the potential revenues generated from a facility. Therefore, for a given size of elevator the general rule is that the more grain processed (up to the limit of the processing capacity) the higher the value of the facility. It also follows that the values of these facilities tend to fluctuate with the amount of grain grown in the region and the market for grains.

Along with the supply and demand issues, the potential performance and value of an elevator is affected by many factors, including the processing capabilities and location of the property with respect to farmers, roads and rail lines, economic conditions, competition, foreign exchange rates, etc. These conditions affect how the market views an elevator, and thus its market value.

Grain Industry Trends

Traditional prairie grain elevators were constructed of wood and located on rail lines to serve the farmers within a 15 to 20 mile radius. There were also some larger terminals, traditionally constructed of concrete, at major collection points.

To reduce the number of times the grain is elevated and transshipped, the business has now evolved towards one-time deliveries at larger, high capacity terminals that are located on major rail lines. Although this gives rise to wider collection areas and longer initial delivery trips, these new, centrally located terminals enjoy certain economies of scale over the traditional and widely distributed elevator. As a result, many traditional elevators are experiencing a certain amount of obsolescence.

The traditional backbone of the grain industry is wheat. However, rye, oats and other exotic grains, such as canola, are gaining prominence in the market place. Such grains have different characteristics and weights per measure of volume, for example, per bushel. Not all elevators can handle all types of grains.

Influence on Value

The value of a specific elevator to its owner is dependent on a number of variables including:

- Grain throughput or processing capacity,
- Storage capacity,
- The presence or non-presence of cleaning, drying, and mixing facilities,
- Types of grain grown in the area,
- Prices of wheat and other grains,
- Decisions of the conglomerates that own a number of elevators in a region,
- The crop year,
- World-wide demand and supply issues,
- Rail rates and railway accessibility issues, and

The Canadian Wheat Board.

A number of these issues are business related as opposed to being a function of the real estate; others are beyond the control of the individual property operator.

Units of Measure

Bushel

A bushel of wheat is the traditional standard measure of wheat. It is a measure of volume rather than weight and, therefore, a bushel of grain will weigh more than a bushel of canola.

1 bushel = 4 pecks = 8 gallons

Tonne

A tonne is a metric measure of weight.

1 Tonne = 1,000 kilograms = 2,204 pounds

1 Tonne = 36.744 bushels of wheat

Throughput or Handle

The throughput or "handle" is the amount of grain processed by a facility each year.

Licensed Capacity

Elevators hold licenses from the Canadian Grain Commission that specify the amount of grain a facility is licensed to contain at one time. A license is set by application from the owner. It can vary from year to year, and does not restrict or necessarily refer to the designed capacity of an elevator.

Designed Capacity

The designed capacity of an elevator refers to the amount of grain that can be stored in the annex, elevator, twin and other storage areas.

Elevator Legs

A "leg" refers to the elevating processor that loads and unloads the grain into the storage areas. A two-leg facility can load and unload grain at the same time.

2.0 Analysis of Valuation Approaches

There are three elements to be considered in the analysis of grain elevators:

The storage capacity,

The elevators (or legs), and

Sundry and supporting improvements including retail outlets.

The specialized types of improvements and the nature of the grain elevator business both serve to limit the methods that can be used to value these properties.

2.1 Approaches

Market Sales Comparison Approach

Grain elevators typically do not sell until near to the end of their economic lives. At this point, some elevators sell as grain storage facilities. Therefore, the market sales comparison approach is typically not useful in the analysis of grain elevator values.

Income Approach

Although the values of grain elevators are largely dependent upon the amount of income generated from the grain processed, the income approach is not the preferred method of establishing market values for assessment purposes. The reasons for this are that these properties typically do not rent, and the lack of sales data makes it difficult to establish the appropriate capitalization rate to be applied in the income valuation approach. Also, the complexity of factors that contribute to the generation of income in a grain elevator makes it difficult to delineate the income attributable to the real estate. These issues make it difficult to establish the valuation parameters required in an income analysis.

Cost Approach

Although grain elevators vary in size and function; can be constructed of wood, metal, and/or concrete; and typically suffer from significant amounts of depreciation, the cost approach can be used to value this type of property. Construction models can be created to depict typical styles of elevators. A replacement cost approach can be used to determine the cost of the elevator improvements as new, and all forms of depreciation can be established from data that are typically available.

2.2 Recommendation

> In the assessment of properties in Alberta, the ***cost approach*** is recommended as the primary approach to be used in the valuation of grain elevator properties.

2.3 Application of the Cost Approach

The theory behind the *cost approach* follows the principle of substitution: a purchaser will pay no more for a property than the cost to replace it with a substitute of equal utility.

There are two principle tasks in estimating value using the cost approach.

Value the Land

Land value is usually established through analysis of comparable market data.

Value the Improvements

1. Estimate the costs as new of the assessable improvements as of the valuation date.

   Such cost analysis requires building inspections, area quantifications, notification of building conditions, and building utility analysis.

2. Deduct from this value an amount reflecting all forms of depreciation including:

   Physical (curable and incurable),

   Functional (curable and incurable), and

   External depreciation (economic obsolescence).

The resulting value will be an estimate of the contribution of the improvements to the market value of the subject property, depreciated for all causes.

Final Value

The final sum of land value plus improvement value is the estimated market value of the real estate of the subject property.

Replacement Versus Reproduction Costs

There are two approaches in determining the costs new of the improvements: reproduction costs and replacement costs.

There tends to be some confusion over the difference between **reproduction costs** and **replacement costs** of a property. A *reproduction* simply duplicates the existing structures; it is an identical replica of the design, layout size, and volume of the existing building. In determining reproduction costs, it may be possible to substitute some of the construction materials used in the original buildings with more modern replacements. However, this does not constitute a determination of functional obsolescence. Neither does it necessarily constitute a determination of market value.

On the other hand, a *replacement* building reflects what actually would be built if the improvements were to be reconstructed. Replacements are therefore designed to replace the existing functions and capacity of the property. To this end, replacements take advantage of any advances in production or technology in the design, layout, and construction of the improvements. Replacement costs, therefore, take into account the elements that give rise to the functional obsolescence inherent in the property.

If the valuator starts with a reproduction cost analysis, he or she must ensure that all forms of depreciation are considered to arrive at an estimate of market value.

Depreciation Defined

> *"The loss in utility and hence value from any cause."* [Basics of Real Estate Appraising, Appraisal Institute of Canada, 1991 p. 284]

The concept of depreciation is simple, yet all encompassing - *a loss in value from any cause.*

Depreciation and the Market Comparison Approach

The inherent advantage of a *market comparison approach* is that all forms of depreciation are taken into account when an informed buyer purchases a property from an informed seller.

Depreciation and the Cost Approach

With the *cost approach,* determining the appropriate amount of depreciation and, therefore, the appropriate market value is more complicated. The approach generally starts with the amount it cost to reproduce the property as new. Then, given this amount, the valuator is charged with the task of producing an estimate of what the market would pay for such a property. The difference between the cost new and the amount the market would pay for the property is the depreciation inherent in the property.

The process of estimating value using the *cost approach* is not just a calculation exercise to determine costs new and applying a percentage deduction indicated for the effective age of the property. In the *cost approach* the analysis of depreciation is just as important as the analysis of costs new. There are many reasons why a property can loose value. All types of depreciation and all causes of depreciation should be explored and analyzed to arrive at the correct value.

Physical Deterioration

Physical depreciation acknowledges that all building improvements deteriorate over time and, as a result, have limited life spans. Therefore, physical depreciation generally relates to the age of the property. Some forms of physical depreciation are curable while others are not economically viable to correct. The loss in value from deterioration is a simple reflection of the fact that a prospective purchaser will pay less for an older building in poor shape than a similar newer one in good shape. Such depreciation is determined by establishing the current condition of the property and estimating the effective age and the remaining physical life of the improvements.

Physical depreciation can be analyzed in a very detailed manner by judging the condition and expected remaining physical life of each building component. This includes short term life components such as head drives and ventilation systems, and long term items such as the walls and foundation. Some items may be curable (ventilation systems) and others may not be economically prudent to fix (walls). The amount of analysis required and the number of judgments concerning the condition and expected life of each component limits the applicability of this detailed method.

A more generalized approach would be to review the condition of the property on the whole, determine its effective age and, given the expectation of typical maintenance, determine the physical life of the buildings.

Obsolescence

Depreciation arising as a result of obsolescence can be broken down into two components: 1) functional obsolescence, and 2) economic obsolescence (sometimes referred to as external, or locational depreciation). Such depreciation is not related to the age of the property but arises out of analysis of the functionality and external conditions that may affect the value of the property.

"Obsolescence" is a reflection of the simple proposition that people pay less for items or properties that have lost functionality, attractiveness, or utility. It is defined in the Basics of Real Estate Appraising [op.cit.] as follows:

> *A loss in utility, and hence value, because of the inability of any component part of the structure or any item of equipment to perform its proper function according to today's standards and requirements. It is inherent in the property and is a loss from reproduction cost new, as of the date of appraisal, caused by deficiency, inadequacy, super adequacy, unattractive or unacceptable style, poor or inefficient design.*

Depreciation Schedules

Most valuation manuals contain depreciation schedules that are intended to reflect the amount of normal, physical, and age-related depreciation in a property. This method of estimating depreciation relies upon three separate points of analysis:

Analyzing the effective age of the improvements,

Determining the expected life of the improvements, and

Recognizing that the property may be subject to other forms of depreciation.

2.4 Practical Valuation Process

In this valuation guide, the cost approach has been developed into a practical valuation tool utilizing spreadsheets.

Guidelines and instructions follow on:

Using these spreadsheets,

Collecting data,

Determining costs new,

Analyzing physical depreciation,

Analyzing functional and economic depreciation,

Developing market value, and

Controlling the quality of assessment values.

3.0 Steps in the Valuation Process

Overview of Grain Elevator Valuation Procedure

1) **Collect appropriate information.**

2) **Establish land values using the market sales comparison approach.**

3) **Classify elevators by type according to their size and features.**

4) **Estimate *replacement* costs new (RCN) of improvements based upon the class of elevator.**

5) **Determine normal age-related depreciation on the basis of the quality and condition of improvements, and deduct this amount from costs new.** This is often referred to as replacement costs new less depreciation (RCNLD).

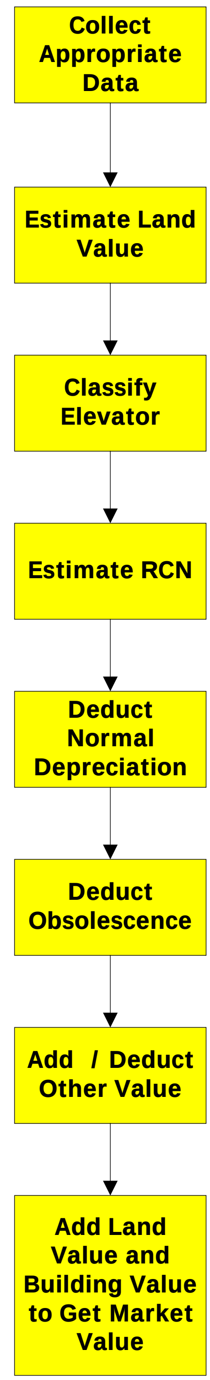
6) **Determine typical functional and economic obsolescence on the basis of throughput. Deduct this from the RCNLD.**

7) **Add or deduct other values (other improvements or other depreciation) to produce:**

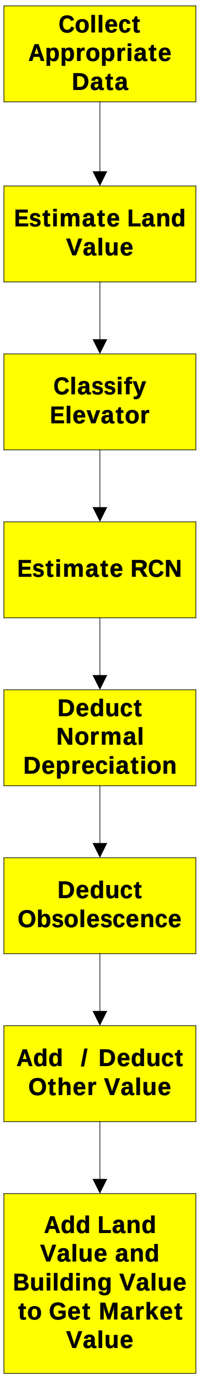
   MARKET VALUE OF IMPROVEMENTS

8) **Add the market value of the land to the market value of the improvements to produce:**

   MARKET VALUE OF THE PROPERTY



How the Approach Works



Basing costs new on *replacement* costs[1].

The costs new of the elevator, twin, annex, other grain storage areas, and other grain handling processes are based on *the current licensed capacity requirements.*

Replacement costs of typical types of elevators (replacement models) should be established on a rate per tonne basis (licensed capacity) by studying actual costs and cost manuals for:

Wood-crib facilities,

Composite construction facilities,

Modern, larger, higher turnover facilities, and

Large capacity facilities.

Costs new for all the typical and assessable structural components (elevators, twins, operator's office, etc.) are based on rates established per tonne for that class or type of elevator. Costs new of other buildings, for example a regional office, store, and yard improvements are based on required building areas and cost through the study of actual costs or using manuals such as the *Marshall & Swift Valuation Service Manual*.

Depreciation

Normal age-related depreciation is based on the age and condition of the property and established from depreciation tables.

Obsolescence is established by comparing actual throughput to the typical throughput objectives for that class of elevator.

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1 *Replacement* costs entail the development of costs for a model facility. The costs of such a model could be determined using the Alberta Assessment Manual, actual costs, or the *Marshall & Swift Valuation Service Manual.*

3.1 Collect Appropriate Data

More than any other factor, efforts made at the information collection stage determine the quality of the final analysis.

Several types of information should be collected including:

Performance data,

Industry data,

Construction costs, and

Property inspection/ physical data.

Helpful sources of information that can be used in the valuation of grain elevators include:

Assessment records,

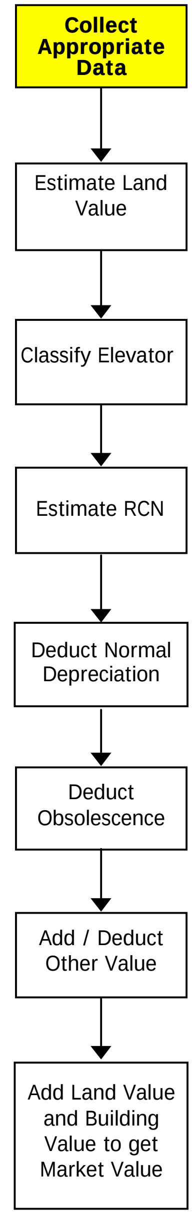
Grain elevator companies,

The Canadian Wheat Board,

The Canadian Grain Commission,

Building permits, and

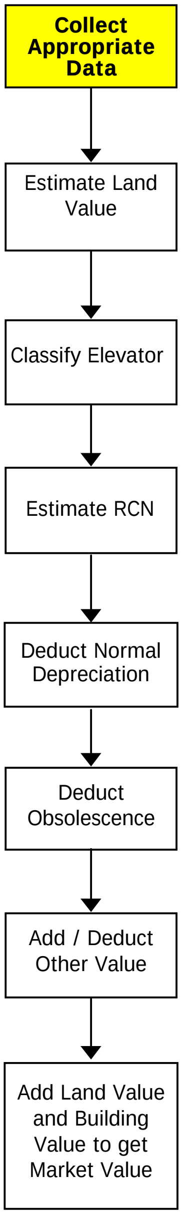
Cost manuals.



Performance and Industry Data

Since the value of an elevator relates in large part to its throughput (the amount of grain it processes), establishing typical throughput levels is a key issue in the valuation of these properties. The typical elevator business goes through cycles, as varying amounts of wheat or grain are grown and processed each year. To stabilize the value of these facilities and the assessments generated, assessors must consider the performance of an elevator over a number of years.

It is recommended that the value of a grain elevator be based on its performance over a three to five-year period.



Performance data can be determined in aggregate from figures published by the Canadian Wheat Board. In addition, information about grain elevators and the amount of grain processed by each individual elevator, or a group of elevators, can be obtained through the Country Elevators Association.

Construction Costs

The bricks and mortar construction costs of a building can be estimated from a number of different cost manuals. Some manuals include "construction models" of grain elevators that can be used to estimate costs new. Analyzing **actual construction costs** is also a useful way to determine value as new, especially when considering replacement costs.

The actual construction cost data for all new elevators and major reconstruction work should be requested from the owners. In addition, it may be useful to consider the information provided on any building permit.

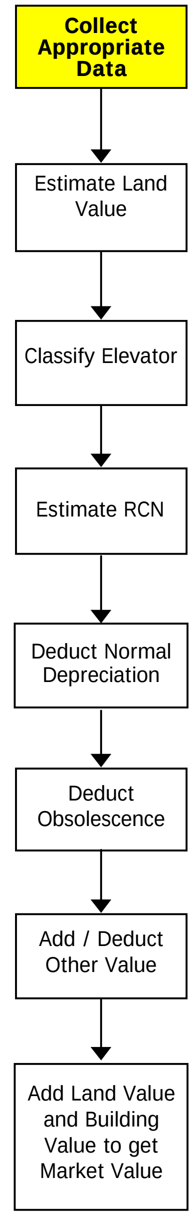
When analyzing construction cost data, exercise caution. Ensure that the actual costs reflect the costs of all assessable items and only those items that are assessable.

Property Inspection/ Physical Data

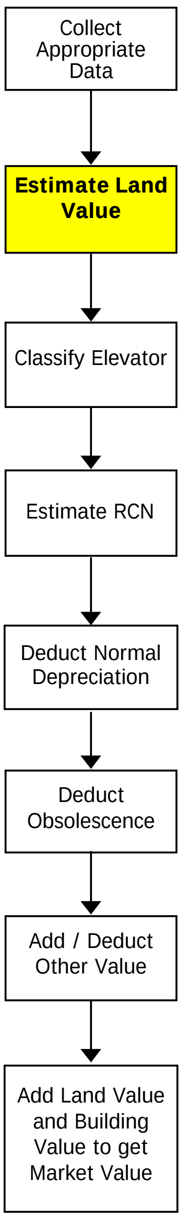
To keep records up to date, all assessed properties should be inspected from time to time. Along with the designed capacities, square footages, and physical measurements, the following items should be noted when inspecting a grain elevator:

Building quality and construction materials,
Construction dates,
Building condition,
Equipment condition,
Operation problems and equipment adequacy,
Time since last equipment upgrade,
Extra features in the elevator and/or yard,
Site location, suitability, and environmental issues,
Transportation/ rail service (leases, line condition, etc.),
Number of rail car loading spots,
Throughput history, and
Competition.

It may be necessary to talk with the property manager or owner to obtain some of this information.



3.2 Estimate Land Value



Land Sales

The *cost approach* requires valuation of the land along with analysis of the building values. Land should be valued using the market sale comparison process.

Land sales data will be required to complete this analysis. Preferably, the land sales should be of sites of approximately the same size, with similar zoning, situated in a comparable location, and taking place on or about the date of valuation.

Once sales data in and around the valuation date have been collected, it becomes possible to establish the value of the grain elevator site using the *market sales comparison approach.*

Adjustments to value may have to be made for the following points of comparison between the subject and the properties that have sold:

Location,

Access / transportation,

Size of site,

Zoning,

Topography,

Site servicing costs,

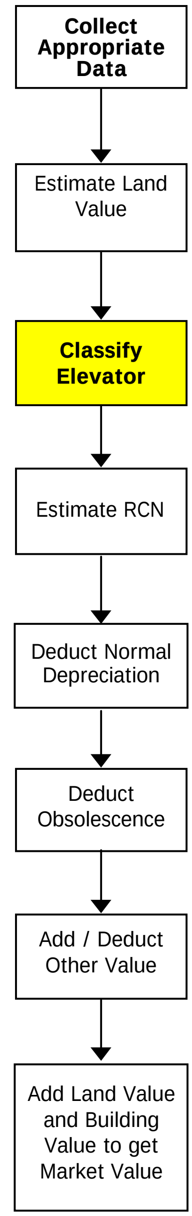
Environmental concerns, and

Time of sale.

Comparable land sales should be investigated to ensure that the results reflect the amounts that would be forthcoming in fee simple, arms-length, market transactions. In addition any leases and leasehold interests, which are prevalent in the grain elevator industry, should be considered in the analysis of land values.

3.3 Classify the Grain Elevator by Replacement Model

Grain elevators vary in size, construction materials, and function, and could be classified along these lines. However, under a *replacement cost* analysis, all elevators of a certain size and function would be *replaced* with modern equivalents using modern construction techniques.



Proposed Grain Elevator Classes (Cost Models)

> The valuation of elevators is to be based upon replacement costs. This concept implies that no matter how the existing elevator is designed, and no matter what the existing construction material (wood, wood and steel, wood and concrete, concrete and steel, or concrete), the question to be addressed is what would be constructed to replace the existing functionality of the property?
>
> This is not necessarily the same question as "what type of elevator would be built to-day?" as a modern elevator may incorporate better functionality than the existing structure.

Classes

It is proposed that four classes of grain elevator models be established to provide base costs, in rates per tonne. The cost rates employed should vary to recognize the economies of scale, i.e., the larger the facility the lower the cost per tonne.

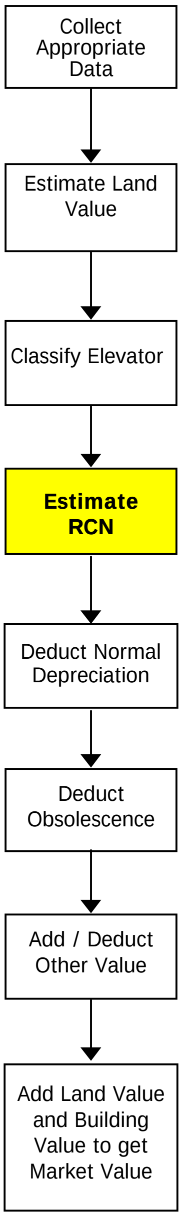
1) Smaller elevators with wood crib construction.

2) Small to medium sized facilities of composite construction (wood, steel and/or concrete). These elevators typically have upgraded their processing equipment.

3) High turnover, modern facilities generally constructed of steel and concrete over 10,000 tonnes.

4) Large volume older terminal facilities. There are only three such facilities in Alberta.

3.4 Estimate Replacement Costs New



Replacement costs new of an elevator will be based on the licensed capacities of the various grain operations, the size and quality of the office, and the cost estimates of other buildings and yard improvements.

Developing Replacement Costs

Typical Items

The replacement cost rates per tonne of licensed capacity *should be developed* for each class of elevator, and these costs are to include in one cost figure all the components typically associated with that class of elevator operation (twins, annexes, elevators, operator's office, etc.).

Additions

Rates for assessable items that tend to vary from site to site such as yard improvements, retail stores, extra floor for grain cleaning operations, and other such improvements must also be developed. It is expected that the costs new for assessable items such as yard improvements and other structures (retail stores, regional grain offices) can be developed in the more traditional manner from cost manuals.

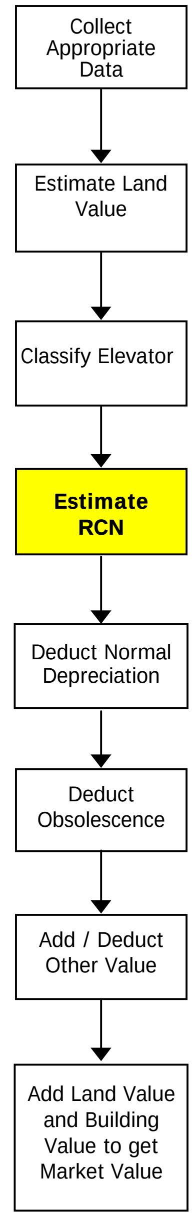
Assessable Machinery and Equipment

In addition to the building and yard improvements, certain equipment, such as grain drying and grain cleaning are also assessable, but at a different tax rate. The value of these items should be established separately using a study of actual costs or through other research.

Determining Costs New

The best way to determine both the replacement models and the current cost of construction are from elevator operators as follows:

1) Approach the Country Elevators Association or individual elevator companies for cost information.
2) Analyze recent construction designs and costs. Update these costs to current values.
3) Perform an independent study by determining costs through application of a cost manual to recently constructed elevators.
4) Approach construction firms for such cost information.



Example of Replacement Cost Rates per Tonne

> The rates contained herein are for illustrative purposes only and are not to be used as the basis for establishing values.

A study of the actual costs and costs contained in various manuals might produce the valuation rates per tonne listed at Figure 1 on the next page. The costs so developed would include the *value of all assessable items typically associated with each class of elevator*.

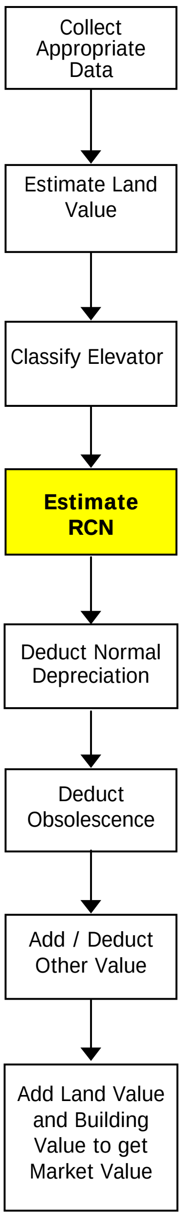
Offices, warehouses, stores and other such items should be categorized according to their quality and costs per square foot (or linear foot). Costs can be developed from studies of actual construction or from cost manuals.

Examples of costs per unit rates are displayed in Figure 1. This is followed by an example of a Class 2 grain elevator cost analysis, displayed in Figure 2.

Note: The sample cost rates supplied in Figure 1 are designed to cover most of the improvements found in a typical elevator. For items not covered in this study, refer to the cost manual.

Figure 1: Sample Cost Rates by Class of Elevator

These figures are for illustration purposes only - not to be used in the valuation of properties



	Rates per Tonne of Capacity			
	Class of Elevator			
	1	2	3	4
Base Model Size in Tonnes	5,000	6,000	11,000	60,000
Base Model Rate per Tonne	$630.00	$650.00	$678.00	$579.00

Rates per Tonne Adjustment Table

From	To	1	2	3	4
0	1,500	$ -	$ -	$ -	$ -
1,501	3,000	$650.00	$696.00	$ -	$ -
3,001	4,500	$630.00	$650.00	$ -	$ -
4,501	6,000	$615.00	$650.00	$ -	$ -
6,001	7,000	$ -	$638.00	$722.00	$ -
7,001	9,000	$ -	$ -	$678.00	$ -
9,001	12,000	$ -	$ -	$641.00	$ -
12,001	15,000	$ -	$ -	$618.00	$ -
15,001	25,000	$ -	$ -	$ -	$579.00
25,001	70,000	$ -	$ -	$ -	$532.00

		Quality of Improvement		
Other Improvements		Low	Average	High
Office	Sf	$46.00	$55.00	$70.00
Retail Store	Sf	$58.00	$65.00	$70.00
Extra Cleaning Floor	Sf	$29.00	$34.00	$45.00
Drive Shed	Sf	$29.00	$39.00	$45.00

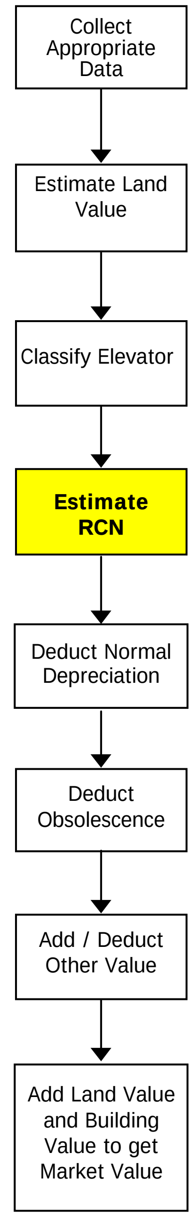
Other Yard		Rate
Pavement	Sf	$1.80
Fence	Lf	$19.00

Figure 2: Example of Replacement Costs New Analysis

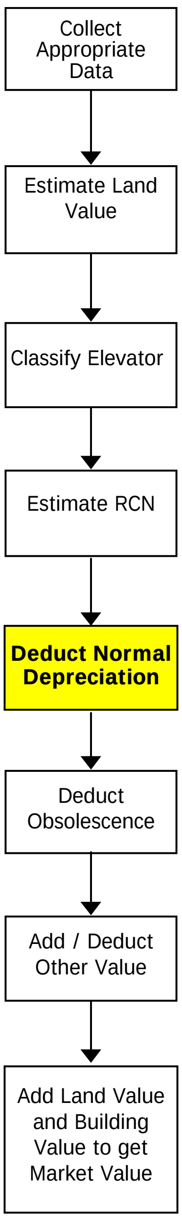
Address	10000 12th Line
Municipality	Drumheller
Roll #	123456
Value date	1-Jul-98

Replacement Cost Analysis

Item	Units in Tonnes	Rate	Costs New
Elevator	4,500	$650.00	$2,925,000
Other	0		$0
Extra Office (sf)	1,000	$55.00	$55,000
Extra Floor (sf)	866	$34.00	$29,400
Drive shed (sf)	750	$39.00	$29,300
Retail store (sf)	0		$0
Other bldg (sf)	0		$0
Pavement (sf)	30,000	$1.80	$54,000
Fence (lf)	800	$19.00	$15,200
Other yard	0		$0
Other yard	0		$0
Total: Assessable Structures			**$3,107,900**



3.5 Deduct Age-Related Depreciation



Depreciation due to age reflects physical deterioration of the property over time and the normal decline in value due to loss in functionality. Such depreciation is usually expressed as a percentage of costs new.

Though a *replacement cost* analysis typically gravitates towards one type of construction for a class of elevator, the normal physical depreciation inherent in a property should be based on the actual construction materials and condition of the improvements.

Determining Effective Year Built

To complete the analysis of value the *effective age of the property must be determined.* Form GE1 - Grain Elevator Data Entry contains a formula that will calculate *effective year built* based upon the average age of the structural improvements (weighted by capacity). This formula can be adjusted by entering an adjustment factor to the automatic calculation (add years for good condition, subtract years for poor condition).

Depreciation Schedules

Most valuation manuals contain depreciation schedules that are intended to reflect the typical amount of normal, physical, and age-related depreciation in a property. This method of estimating depreciation relies on three separate points of analysis:

Effective age and condition of the improvements,

Expected life of the improvements, and

Any other forms of depreciation inherent in the property.

Automatic Application of Depreciation Schedule

The spreadsheet provided to assist in the valuation of grain elevators has a "built-in" depreciation schedule based upon the Marshall & Swift Valuation Service Manual schedules. For example, MS50 is Marshall & Swift's 50-year life schedule. If desired, the assessor can alter the schedule contained in the spreadsheet to reflect rates provided by other manuals.

To determine the appropriate amount of age-related depreciation, the assessor should analyze the effective year built for the grain elevator improvements. The grain elevator will be valued using one overall year built figure. Ages for the other assessable improvements (office, store, cleaning facilities, etc.) may be based upon the actual year of construction (unless otherwise adjusted).

The GE2 spreadsheet also allows the flexibility to apply a uniform depreciation rate to all improvements, or individual rates to each improvement.

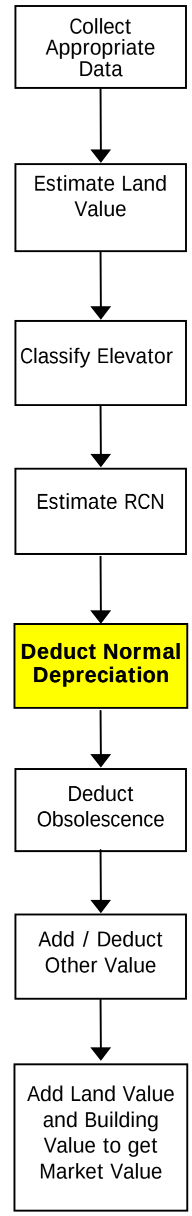


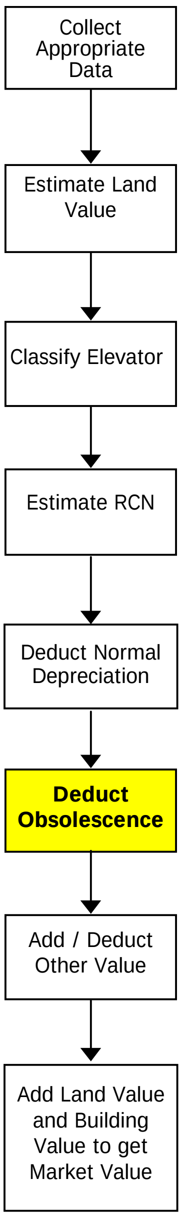
Figure 3: Example of Depreciation Calculation

Address	10000 12th Line
Municipality	Drumheller
Roll #	123456
Value date	1-Jul-98

Replacement Cost Analysis

Item	Costs New	Effective Yr. Built	Dpn Table	Dpn %	Costs New less Dpn
Elevator	$2,925,000	1974	MS60	13%	$2,544,750
Other	$0	0		0%	$0
Extra Office (sf)	$55,000	1966	MS50	38%	$34,100
Extra Floor (sf)	$29,400	1982	MS60	7%	$27,342
Drive shed (sf)	$29,300	1982	MS30	39%	$17,873
Retail store (sf)	$0	0		0%	$0
Other bldg (sf)	$0	0		0%	$0

In 1998, the elevator portion of this property had an effective year built of 1974, or an effective age of 24 years. Looking up 24 years on Marshall & Swift's 60-year life depreciation table indicates a typical depreciation rate of 13%, which was then applied (automatically) to reduce the cost new to $2,544,750. Similarly, other elements of the property were also analyzed based upon their effective age and estimated economic life.



3.6 Deduct Obsolescence

Establishing Obsolescence

Typically, two obsolescence issues arise in the valuation of grain elevators:

1. Functional obsolescence arising from the layout and construction of the buildings, and
2. Economic obsolescence arising from insufficient throughput.

Functional Obsolescence

By employing a *replacement* cost analysis based upon the licensed capacity of the elevator, assessors deal with most of the functional obsolescence arising as a result of layout and construction problems. In most cases, any remaining obsolescence is a function of the relationship between capacity and throughput.

Economic Obsolescence

Economic obsolescence arising from limited throughput is based on the premise that any elevator must throughput a certain volume of grain over time in order to remain viable. Volumes below this amount indicate that the property is suffering from obsolescence. Therefore, each elevator must reach a certain volume of grain, or throughput objective, to be viable.

These throughput objectives could vary by class of elevator and might vary slightly from one year to the next - depending on the margins in the price of grain. Furthermore, in line with the determination of fee simple values, assessments should establish the typical throughput objective for each class of elevator.

Analysis of Throughput Objectives for Each Class of Elevator

Through analysis of the history and actual throughput of the elevators in Alberta over the past three years several observations were made.

There is a wide range in the amount of grains throughput from 1.24 turns to 21.65 turns.

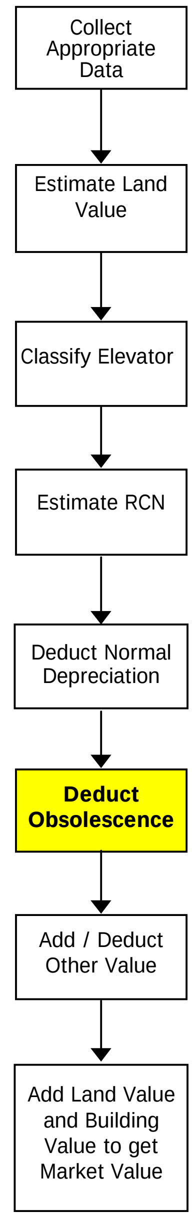
As throughput is influenced by local economic conditions including crop yields and competition, every class of elevator experienced a range of throughput ratios. The most consistent performers were the large volume "terminal" elevators.

Older elevators with licenses of less than 10,000 tonnes, whether constructed of wood and/or wood and steel, seem to throughput less grain than newer elevators.

Since the assets of older elevators are generally paid off, they typically do not require as much income to reach the break-even point. On the other hand the older elevators tend to be less efficient and therefore incur a larger degree of obsolescence.

No elevator will be economically viable if it does not throughput grain. **Therefore, 0.0 turns was established as the point where the maximum amount of obsolescence should apply.**

Typical obsolescence due to throughput seems to apply at different rates to the different classes of elevator.



Class Throughput Objectives

Given these observations the break-even points were considered for each class of elevator.

Obsolescence Classes

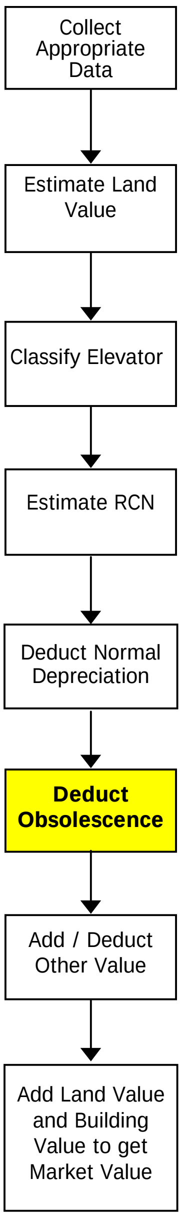
The obsolescence classes follow from the types of construction established in the determination of replacement costs.

Class 1 - Wood crib elevators less than 10,000 tonnes.

Class 2 - Elevators of composite construction, generally with recent equipment renovations, less than 10,000 tonnes.

Class 3 - Modern elevators over 10,000 tonnes.

Class 4 - Old, large capacity terminal elevators.



Class Throughput Objectives and Maximum Obsolescence

At the present time the throughput objectives and the maximum obsolescence to be applied in valuing these classes of elevators have been established as follows:

Class	CTO (turns)	Max Obsolescence
1. Wood Crib	5.0	75%
2. Composite	7.0	50%
3. Modern	0.0	0%
4. Large	0.0	0%

These figures are subject to change.

Therefore the obsolescence factor generated through this process will range from 0% for facilities that meet or exceed the class throughput objective to a maximum of 75% obsolescence for a Class 1 elevator, and 50% for a Class 2 elevator.

The obsolescence that arises as a result of insufficient throughput should be based on the average stabilized throughput over the past three to five-year period. Using stabilized throughput helps to adjust for the naturally occurring peaks and valleys in the grain trade. At the same time, this allows for appropriate measures of obsolescence for facilities that have chronic problems.

Notes:

Although the typical obsolescence allowances included here are designed to be applicable to most elevators, individual elevators may have specific circumstances that require additional or different considerations by the assessor. If the guidelines provided in this guide are not appropriate, then the obsolescence conditions and the obsolescence deduction should be noted by the assessor in the valuation of that elevator.

The throughput obsolescence adjustments should apply to all buildings associated with the grain operations. Other improvements such as a retail store may or may not be subject to the same obsolescence considerations and the assessor must make a judgment call as to the appropriate obsolescence adjustment to apply to these other improvements.

For the improvements associated with grain operations the obsolescence based on throughput ratios is calculated automatically on spreadsheet GE2. The obsolescence calculation formula used is explained below.

Throughput Obsolescence Formula - Example

Obsolescence = (CTO – AST) x (Max/ (CTO-LVL))

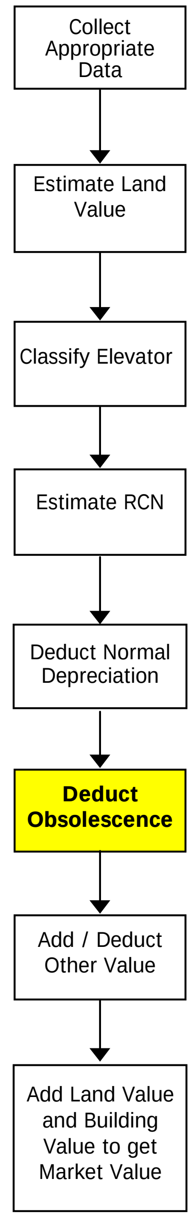
CTO = Class throughput objective ratio

ATR = Actual stabilized turns

ATR is less than CTO

LVL = Level at which the maximum obsolescence applies

Max = Maximum obsolescence

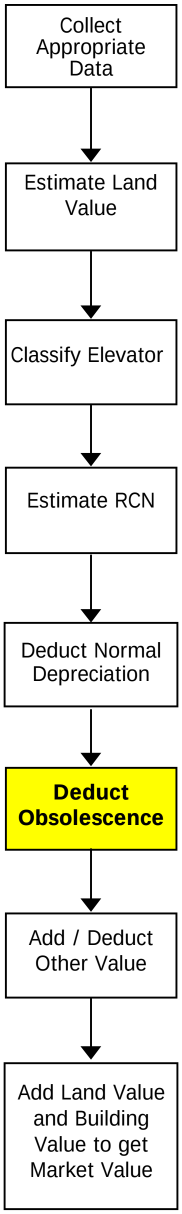


The formula produces straight-line obsolescence reductions beginning at the point where the throughput for the subject (ATR) falls below the expected or break even throughput objective for that class of elevator (CTO). The rate of decline is dictated by the factor (75%, 50%, or 0%) and the variable LVL dictates that, at the set minimum level, the elevator suffers the maximum amount of obsolescence, e.g., 75%.

The results of applying the formula to various performance levels are charted in Figure 4.

Once the normal physical depreciation, on the basis of effective age and any obsolescence, has been estimated on the basis of throughput, the depreciated replacement costs new can be determined.

Figure 4: Throughput Obsolescence Adjustments - 1998



These numbers are subject to change.

Example of Throughput Obsolescence Adjustments

Calculation formula:

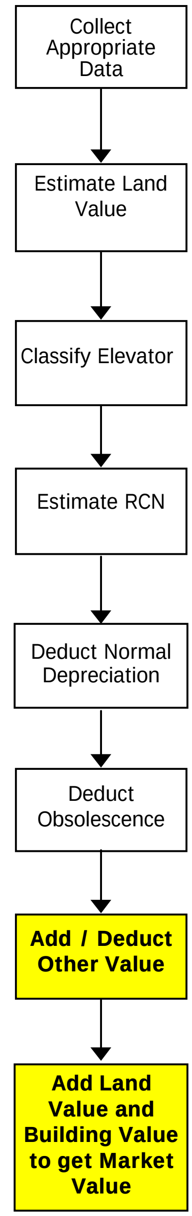
Where: CTO = Class Throughput Objective Ratio
AST = Actual Stabilized Turns
MAX = Maximum Obsolescence Rate
LVL = Level at which Obs. = MAX

Obsolescence = (CTO - AST) x (MAX / (CTO - LVL))

		Throughput Adjustments - % Obsolescence			
		Class 1	**Class 2**	**Class 3**	**Class 4**
Objective	**CTO**	**5.0**	**7.0**	**0.0**	**0.0**
Max. Obs.	**MAX**	**75.0%**	**50.0%**	**0.0%**	**0.0%**
Min. Level	**LVL**	**0.0**	**0.0**	**0.0**	**0.0**
Turns	**AST**				
12.00		0.0%	0.0%	0.0%	0.0%
11.00		0.0%	0.0%	0.0%	0.0%
10.00		0.0%	0.0%	0.0%	0.0%
9.00		0.0%	0.0%	0.0%	0.0%
8.00		0.0%	0.0%	0.0%	0.0%
7.00		0.0%	0.0%	0.0%	0.0%
6.50		0.0%	3.6%	0.0%	0.0%
6.00		0.0%	7.1%	0.0%	0.0%
5.50		0.0%	10.7%	0.0%	0.0%
5.00		0.0%	14.3%	0.0%	0.0%
4.75		3.8%	16.1%	0.0%	0.0%
4.50		7.5%	17.9%	0.0%	0.0%
4.25		11.3%	19.6%	0.0%	0.0%
4.00		15.0%	21.4%	0.0%	0.0%
3.75		18.8%	23.2%	0.0%	0.0%
3.50		22.5%	25.0%	0.0%	0.0%
3.25		26.3%	26.8%	0.0%	0.0%
3.00		30.0%	28.6%	0.0%	0.0%
2.75		33.8%	30.4%	0.0%	0.0%
2.50		37.5%	32.1%	0.0%	0.0%
2.25		41.3%	33.9%	0.0%	0.0%
2.00		45.0%	35.7%	0.0%	0.0%
1.75		48.8%	37.5%	0.0%	0.0%
1.50		52.5%	39.3%	0.0%	0.0%
1.25		56.3%	41.1%	0.0%	0.0%
1.00		60.0%	42.9%	0.0%	0.0%
0.75		63.8%	44.6%	0.0%	0.0%
0.50		67.5%	46.4%	0.0%	0.0%
0.00		75.0%	50.0%	0.0%	0.0%

3.7 Add / Deduct Other Components of Value

For some properties, the value is not entirely captured by the foregoing analysis and a lump sum addition or deduction is required. For example, it may be desirable to value the retail store on an elevator property using the *income approach* and add this value at the end. Alternatively, the property may require a new drainage system to control flooding or another curable item may need to be fixed. This amount can be noted and deducted from the value total as an “other value” item.



3.8 Market Value of Property

Summary

Market value is determined by adding the value of the land as established through a *market sales comparison approach* to the value of the improvements. Improvement values are established on the basis of *replacement* costs new, and depreciation due to age and obsolescence is deducted from costs new. The resulting market value of the improvements is added to the value of the land. Then, if required, any additional value considerations are taken into account to produce an overall market value for the property.

To assist with analysis of improvement values *replacement models* for the typical types of grain elevators found in Alberta should be developed. Age-related depreciation is established on the basis of cost manual schedules, and adjustments for obsolescence are made by comparing the stabilized throughput of the elevator against a class throughput objective.

An example of a grain elevator valuation is presented in section 5.0.

4.0 Quality Validation Issues

The strength of an assessment system rests on two tenets: its ability to produce appropriate market values, and its ability to treat similar properties fairly and consistently.

To accomplish these ends, the valuation process should reflect the views and methods used in the marketplace. The process should be applicable to all properties, but it should have enough flexibility to deal with the variations and market conditions encountered.

Typically, the quality of the valuation results can be ensured, quickly and efficiently in three areas: 1) valuation parameters, including such things as r*eplacement cost rates, depreciation rates, and obsolescence adjustments*, 2) checks against sales values, and 3) data filters for ensuring the input of appropriate data.

Valuation Parameters

The proposed system sets up a table of costing rates based on the type of elevator and the quality of construction. Normal depreciation is set by depreciation schedules contained in accepted cost manuals. Obsolescence is considered in two ways:

By determining the appropriate replacement model for the property, and

By applying obsolescence based on throughput.

The notion of obsolescence based on throughput is applied in other assessment jurisdictions – most notably Saskatchewan and Manitoba. It is also an acceptable approach from the owner's point of view because it is based on the performance of the property. A well performing property is not affected by obsolescence, but a property that does not achieve a certain standard is affected.

If the assessor stays within the valuation parameters when valuing a property, the system will be applied fairly and consistently.

The process also requires an assessor to give reasons for applying a different parameter. In this way, the process incorporates flexibility and accountability.

Check Against Sales Values

To ensure that the assessment values developed are in line with the market, the assessor should check them against sales. Since there is a notable lack of appropriate sales to check, it may be difficult to carry out this process for grain elevators.

Data Filters

Another way to ensure consistent and reliable results is to place data filters on the input. For example, all elevator costs must fall between $400.00 and $900.00 per tonne.

5.0 Example of Grain Elevator Valuation

The two forms shown on the following pages illustrate an example of a grain elevator valuation. Values and pertinent data are to be entered in the blank (white) cells. All shaded cells are either formulas or “look-up” cells and should not be over-written.

Form GE1 – Grain Elevator Data Entry

The assessor should enter all the pertinent physical and descriptive data about the property. The data entered on this worksheet will be carried forward onto Form GE2 as required.

Note: *The form is set up to accept measurements in feet or metres, and bushels or tonnes.*

Form GE2 – Grain Elevator Valuation Summary

The assessor should enter the pertinent cost data, the effective age of the improvements and the depreciation table to be employed in the analysis of normal depreciation. Given this information and the correct capacities or building areas, the spreadsheet will calculate the appropriate market value for the property.

Figure 5: Form GE1 – Grain Elevator Data Entry - Example

LINE				
1.1	Address	**10000 12th Line**	Value Date	**2-Jul-02**
1.2	Owner's name		Measurements in	feet
1.3	Municipality	Drumheller	Grain in	Tonnes
1.4	Roll #	123456	Licensed Capacity	4,500

LINE	**Elevator**	Capacities in Tonnes	Construction Date	Construction Material
1.5	Elevator	900	1966	wood
1.6	Storage #1	1,200	1976	metal
1.7	Storage #2	2,400	1966	wood
1.8	Storage #3	0		
	Other			
	Other Structures	Areas in (sf)		Quality
1.9	Extra Office	1,000	1966	Fair
1.10	Extra Floor	866	1982	Average
1.11	Drive shed	750	1982	Average
1.12	Retail store			
1.13	Other bldg			

Effective Year Built Calculation	
Condition:good, avg, poor	good
Effect of Cond.	5.0
Effective Age	1974

Yard Improvements	
Pavement (sf)	30,000
Fence (lf)	800
Other yard	
Other yard	

LINE	**Equipment**	Capacity	Age	Comments
1.14	Cleaning	4,500	1992	New drying facility installed in 1992
1.15	Drying			
1.16	Other			

LINE	**Inspection Notes**	
1.17	Inspection date	
1.18	Building quality/condition	
1.19	Comment on operations	
1.20	Time of last upgrade	
1.21	Extra features	
1.22	Comment on site/ location	
1.23	Number of car loading spots	
1.24	Comment on rail line/ lease	
1.25	Comment on competition	

LINE			
1.26	**Land**	Site area	11.800

LINE	**Throughput**	1997	1996	1995	1994	1993
1.27	Tonnes	25,434	22,789	23,201	25,667	19,872
1.28	Capacity	4,500				
1.29	Turns	5.65	5.06	5.16	5.70	4.42
1.30	Stablized throughput ratio		5.20			

Figure 6: Form GE2 – Grain Elevator Valuation Summary - Example

	Address	10000 12th Line
2.1	Municipality	Drumheller
	Roll #	123456
2.2	Value date	1-Jul-98

Licensed Capacity	4,500	Objective	7.00
Elevator Class	2	Max Obs:	50.0%
Average Turns	5.20	Level:	0.00

Replacement Cost Analysis

	Item	Units in Tonnes	Rate	Costs New	Effective Yr. Built	Dpn Table	Dpn %	Costs New less Dpn	Obsoles %	Improvement Value
2.3	Elevator	4,500	$650.00	$2,925,000	1974	MS60	13%	$2,544,750	12.9%	$ 2,217,269
2.4	Other	0		$0	0		0%	$0	12.9%	$ 0
2.5	Extra Office (sf)	1,000	$55.00	$55,000	1966	MS50	38%	$34,100	12.9%	$ 29,712
2.7	Extra Floor (sf)	866	$34.00	$29,400	1982	MS60	7%	$27,342	12.9%	$ 23,823
2.8	Drive shed (sf)	750	$39.00	$29,300	1982	MS30	39%	$17,873	12.9%	$ 15,573
2.9	Retail store (sf)	0		$0	0		0%	$0	12.9%	$ 0
2.10	Other bldg (sf)	0		$0	0		0%	$0	12.9%	$ 0
2.12	Pavement (sf)	30,000	$1.80	$54,000		yard	50%	$27,000	12.9%	$ 23,517
2.13	Fence (lf)	800	$19.00	$15,200		yard	50%	$7,600	12.9%	$ 6,620
2.14	Other yard	0		$0			0%	$0	12.9%	$ 0
2.15	Other yard	0		$0			0%	$0	12.9%	$ 0
	Total: Assessable Structures			**$3,107,900**			**14.5%**	**$2,658,665**	**12.9%**	**$ 2,316,514**

	Land Value	
	Site area	11.800
2.16	Land value per	$ 15,500
	Land Value	**$ 182,900**

Value Ratio - Improvements	
$ per	$555.33

Value Summary	
Land value	$182,900
Building value	$2,316,514
Market Value	**$2,499,000**

Machinery and Equipment

	Item	Units in Tonnes	Rate	Costs New	Effective Yr. Built	Dpn Table	Dpn %	Costs New less Dpn	Obsoles %	M & E Value
2.17	Cleaning	4,500	$70.00	$315,000	1992	MS25	16%	$264,600	4.7%	$ 252,164
2.18	Drying	0		$0			0%	$0	0.0%	$ 0
2.19	Other	0		$0			0%	$0	0.0%	$ 0
	Total: Machinery and Equipment			**$315,000**			**16.0%**	**$264,600**	**4.7%**	**$ 252,164**