

Chapter 1

Introduction

Welcome to the *Guide to Computation and Use of System Level Valuation of Transportation Assets*. This guide describes how to calculate the value of transportation assets to support transportation asset management.

Section 1.1

Background introduces the concepts and components of asset value for TAM as well as some context for the guidance.

Section 1.2

Scope and Organization provides an outline for each of the eight remaining chapters in the guidebook.

Section 1.3

Intended Audiences describes the anticipated users of the guide and the guide's U.S. focus.

Section 1.4

Ways to Use This Guide highlights some of the unique elements included in this guide such as its overview of asset value, step-by-step guidance, practice examples, and practice assessments.

Chapter 1. Introduction

Section 1.1

Background

Determining the value of a transportation organization's physical assets is important for both financial reporting and transportation asset management (TAM). In financial reporting, determining asset value is a fundamental step in preparing a balance sheet for financial statements to inform regulators and investors. For TAM, presenting data on the value of physical assets, such as pavement, bridges, and facilities, communicates what an organization owns and what it must maintain. Furthermore, information about asset value and how it is changing can help establish how the organization is maintaining its asset inventory and helps support investment decisions.

Reporting asset value is required in various documents, such as the financial reports of U.S. public agencies, which are prepared to comply with General Accounting Standards Board (GASB) Statement 34, and National Highway System (NHS) transportation asset management plans. However, there are many nuances concerning how to perform the calculations, and a variety of different approaches has been used in the past for different applications.

Asset Valuation More than Good TAM Practice

Calculating asset value for TAM is not simply good practice; it is also required of state Departments of Transportation (DOT) by Federal regulations. Title 23 of the Code of Federal Regulations (CFR) Part 515 details requirements for State DOTs to develop a risk-based Transportation Asset Management Plan (TAMP).

These regulations, initiated by the legislation Moving Ahead for Progress in the 21st Century (MAP-21), include a requirement for DOTs to calculate the asset value for National Highway System (NHS) bridges and pavement in their state. DOTs must also determine the cost required to maintain the value of their NHS assets.

To comply with the Government Accounting Standards Board (GASB) Statement 34, agencies also record their assets' book value in annual financial reports. GASB 34 allows for either a standard (i.e., historic cost with straight-line depreciation) or modified approach. Many agencies struggle to reconcile financial asset valuation for GASB reporting with asset valuation for the purposes of asset management and the TAMP.

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Figure 1-1 depicts the value of an asset over time, and illustrates the different facets of the value calculation. The left side of the figure shows the value of the asset when it is first constructed or obtained. Over time the asset value tends to decline. The amount of value the asset loses, also called depreciation, represents the consumption of the asset's benefits. If treatments are performed that extend asset life, such as rehabilitation, then the asset may regain some or all of its value. When the asset reaches the end of its life, it is valued at its residual value, also called salvage value.

At each step of the asset value calculation illustrated in the figure, an analyst may choose how to perform the calculation. Specifically, he or she may use different approaches for calculating the initial value of an asset when first constructed or obtained, for establishing how value depreciates, for determining what treatments should be considered in the calculation and what their effects are, and for calculating residual value.

In truth there is no single correct way to calculate asset value, and there are good reasons why one may choose one approach over another or how much detail to incorporate into the calculation. The different approaches result from the fundamental considerations an analyst faces. These include:

- **Different applications of asset value.** The best approach for calculating asset value depends on how the valuation will be used. A private company may be interested in establishing fair market value of its assets to determine the profit to be gained by selling them. For public agencies, the primary purpose of financial reporting is to provide an accurate account of how the agency is spending resources to ensure the agency is financially sound and following regulations. In TAM, asset value supports decisions regarding investments to maintain and extend the life of assets. Another application of asset value is using it to understand the economic benefit or cost of the transportation system to society.
- **Tension between simplicity and complexity.** Often, improving a given approach to calculating asset value requires more data and/or more intensive calculations. For instance, straight-line depreciation is frequently used to determine asset value over time for the financial asset register. However, one can arguably obtain a more meaningful and useful estimate of depreciation

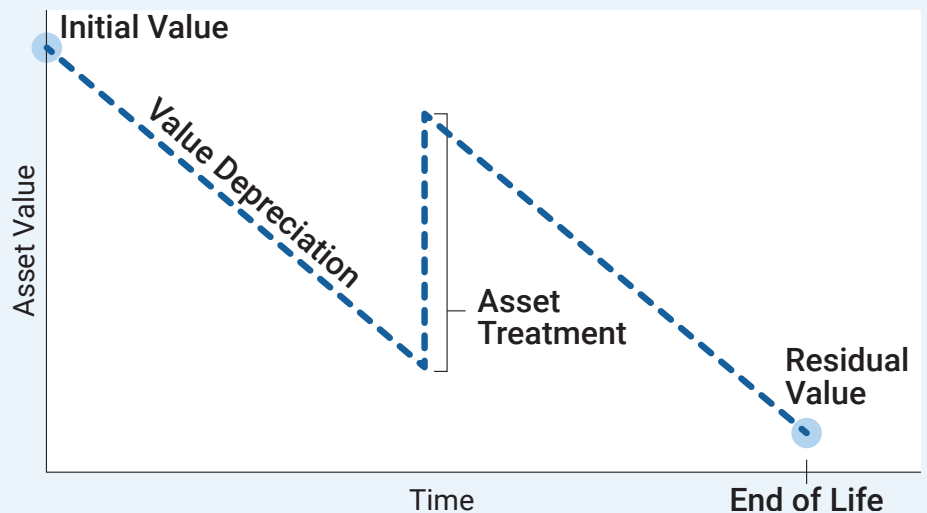


Figure 1-1. Components of Asset Value More than Good TAM Practice

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for TAM applications by utilizing asset condition data to establish asset value for the technical asset register. In these situations, it is important to balance the desire for a more accurate calculation with the benefit of having a simple, repeatable, and sustainable approach.

- **Limits on what a single measure can provide.** Once calculated, the value of an asset provides a powerful and compelling measure. Yet no single number, however well-conceived, is sufficient for conveying all of the information one may wish to communicate regarding an asset. Thus, a valuation approach should be adapted so that it provides the information of greatest use in decision-making. For instance, an agency may wish to tailor the calculation such that annual depreciation approximates the cost to maintain asset value. However, this limits the ability to use the change in asset value in other ways, such as for showing how a proactive preservation strategy could be more cost-effective than a reactive strategy.

The objective of this guide is to provide step-by-step guidance for calculating asset value in support of asset management applications. It describes an approach to calculating value that includes six basic steps, offering alternative approaches for each step to account for the considerations described above, as well as for differences in the scope of the calculation, available data, and other factors.

It is important to note that while the guidance presented here is intended to be consistent with best practices in public sector accounting, this document is not intended as an accounting standard or as guide for calculating asset value in support of agency financial reports. Several accounting standards exist for valuing assets to support financial reporting that do address these topics. The predominant standard for U.S. public agencies is the aforementioned GASB Statement 34 (1), and its international counterpart is the International Public Sector Accounting Standards (IPSAS). IPSAS standards are based on standards of the International Accounting Standards Board (IASB), particularly International Accounting Standard (IAS) 16: Property, Plant and Equipment (2) and International Financial Reporting Standard (IFRS) 13: Fair Value Measurement (3). International Standards Organization (ISO) 55002 asset management standard (4) discusses additional important concepts for relating

“Value From” versus “Value Of”

The recently-updated ISO55002 standard discusses the differences between value generation, the benefits from use or ownership of assets defined as “value from”, and value determination, an asset’s valuation for purposes of sale defined as “value of.”

Using a rental car company as an example, rental vehicles lose sale value (“value of”) immediately after purchase, but the company continues to generate value (“value from”) by renting their cars to users. The rental car company is then able to make a profit from assets which are losing value. In traditional business cases, asset owner investment decisions are more often guided by “value from” than “value of.”

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asset value to asset management, such as the distinction between value generation and value determination. While important to the industry and general understanding, these standards are not the focus of this guidance.

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Scope and Organization

This guidebook consists of nine chapters, a glossary and additional technical appendices. The first two chapters, including this one, introduce the content and key concepts. Chapters 3 to 8 provide step-by-step guidance for calculating asset value. Chapter 9 provides a set of worked examples of the calculations.

The contents of the remaining chapters are as follows:

- **Chapter 2 – Asset Value Framework** introduces the concept of asset valuation. It defines asset value from the cost, market, and economic perspectives, identifies applications of asset value for supporting TAM, and presents the simplified steps for calculating asset value. The chapter concludes with a summary of U.S. and international accounting standards and their underlying assumptions.
- **Chapter 3 – Asset Value Scope** outlines the different factors one should consider when establishing their asset valuation calculation approach. This includes selecting which assets and systems to include in the calculation, reviewing available data, and determining the level of detail at which the calculation will be performed, and specifically whether to break complex assets into components.
- **Chapter 4 – Initial Asset Value** describes how to calculate the initial value of an asset when it is first constructed or obtained. The chapter describes four basic approaches to performing the calculation reflecting different perspectives on asset value: historic cost, replacement cost, market value, and economic value.
- **Chapter 5 – Treatment Effects** identifies and defines which treatment effects should be included in the asset value calculation. It discusses treatment costs, treatment effects, and the concept of residual value.
- **Chapter 6 – Depreciation** describes how to calculate the loss in value of an asset over time. The chapter describes three basic approaches to calculating depreciation. Each approach focuses on a different basis for depreciation: asset age, condition, or the pattern of benefit consumption for the asset.
- **Chapter 7 – Measure Calculation** brings together all of the steps from Chapters 3 to 6 to calculate the overall asset value. Also, it describes how to calculate additional supporting measures, such as the cost to maintain value, asset sustainability ratio, net present value, asset renewal funding ratio, and asset consumption ratio.
- **Chapter 8 – Using Asset Value to Support TAM Decisions** addresses the interpretation, communication, and application of asset value. It explains how to test different treatment scenarios using asset value, and it clarifies when and how asset value can support prioritization. The chapter also explains when and how to use sensitivity analysis to understand the asset value results.

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- **Chapter 9 – Case Studies** presents a set of case studies undertaken to demonstrate the process outlined in this guide. The case studies illustrate scenarios for calculating and applying asset value from a range of different agencies and asset types.

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Intended Audiences

This guide is intended for use by public agencies seeking to calculate asset value in support of TAM and TAM decisions. This includes, but is not limited to, applications such as:

- Using asset value to communicate the extent of assets an agency owns or maintains;
- Reporting asset value in a TAMP;
- Determining how value is expected to change over time given an agency's investment strategy;
- Calculating the cost to maintain asset value; and
- Evaluating the impact of different treatment options on the value of a given asset or asset class.

This guide is designed for use by all U.S. public agencies managing transportation assets, including state and local DOTs, transit agencies, port authorities, airport operators, and others. Key users of the guide include engineers, planners, and analysts charged with managing transportation assets, calculating asset value, and/or helping support investment decisions. The guidance may also be useful for accountants and financial analysts responsible for agency accounting and financial reporting for purposes such as comparing TAM asset value calculations to those developed for financial reports or other applications.

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Ways to Use This Guide

The guide is designed to support a variety of different uses; it offers an explanation of essential concepts, step-by-step guidance, examples, and different levels of maturity in applying the guidance. These applications are discussed below.

Basic Overview of Asset Value and Related Concepts

Each chapter provides an overview of key concepts that help develop an understanding of the subject matter. Chapter 2 introduces concepts related to calculating asset value. Chapter 3 discusses key considerations involved in calculating asset value. In Chapters 4 to 8 the first section of each chapter further details concepts important for applying the guidance in the chapter. For additional information on TAM concepts, the reader should refer to the *American Association of State Highway and Transportation Officials (AASHTO) TAM Guide (5)* and *National Cooperative Highway Research Program (NCHRP) Report 898: A Guide to Developing Financial Plans and Performance Measures for Transportation Asset Management (6)*.

Step-by Step Guidance

Chapters 3 to 8 provide step-by-step guidance for calculating asset value. Each chapter describes the options an agency has in determining how to calculate asset value at each key decision-point. These chapters include flowcharts to assist the decision-making process, such as determining how to calculate the initial value of an asset and how to calculate depreciation.

Practice Examples

There are numerous practice examples in each chapter of the Guide. Chapter 3 offers examples from other agencies illustrating the typical scope selections and their impacts on the valuation. Chapters 4 to 8 include examples of how different agencies have addressed issues discussed in the guidance. Chapter 9 details a set of worked example walking through the asset value calculation from beginning to end.

Practice Assessment

Chapters 4 to 8 each include a section titled "Practice Assessment." This section provides examples of "emerging", "strengthening", and "advanced" practices with respect to different aspects of the asset value calculation. All of the practices described illustrate how the guidance can be applied, albeit with varying levels of complexity. In this context, an emerging practice is one that supports

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the guidance with minimal complexity, an advanced practice illustrates a “state of the art” example in which an agency has addressed some aspect of the asset value calculation in a comprehensive manner, and strengthening practice lies between these two extremes.

Note that the labels applied to the practice examples is designed to be consistent with the maturity scale used in the *AASHTO TAM Guide*. This resource describes additional tools and approaches for assessing TAM maturity.