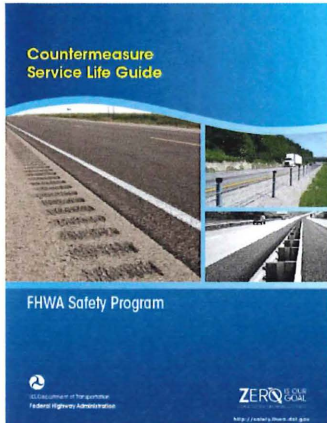


# Countermeasure Service Life Guide



Source: FHWA

## GUIDE HIGHLIGHTS

**Establishes typical service life values** for common safety strategies and countermeasures.

**Defines service life**, relationships between service life and maintenance activities, reasons to consider adopting a standardized service life list, factors that influence countermeasure service life, and analytical considerations when using service life as part of a benefit-cost analysis (BCA).

**Provides examples using service life as part of a BCA**, including when countermeasure service life may be unknown.



Source: FHWA

## Background

Countermeasure service life is a key input variable to conduct a crash-based cost benefit analysis of potential countermeasures for implementation. Crash-based cost benefit analyses provide users with a quantitative measure for determining which safety area(s) or countermeasure(s) would be most cost effective for reducing the number and severity of crashes in a particular area.

The crash modification factor (CMF) Clearinghouse includes a synthesis of countermeasure service lives for various countermeasures. While the synthesis presents a range of service life values for each countermeasure, there is no single national resource that presents typical values of service life for each countermeasure.

The Transportation Pooled Fund Study TPF-5(255), Highway Safety Manual Implementation sponsored the development of a Countermeasure Service Life Guide to fill this need. The target audience of the guide is transportation practitioners, such as traffic and safety engineers, designers, planners, and maintenance staff. The Guide provides comprehensive information on selecting and using countermeasure service lives, regardless of a practitioner's experience level. Transportation practitioners will learn about service lives and their relationships to maintenance activities, and how service life can be included as part of a Benefit-Cost Analysis (BCA).

The Guide is organized into six chapters, with the focus of the Guide presented in chapters 2-5. Chapter 2 provides an overview of service lives and introduces the benefits of standardized service lives for a BCA. Chapter 3 explains selecting a countermeasure service life for a BCA. Chapter 4 describes the process for identifying and suggesting service lives for countermeasures. Chapter 5 presents BCA examples for single countermeasures where the service life is either known or unknown.

## Typical Service Lives

Service life is the number of years that a countermeasure should have a noticeable effect on crashes at a site (AASHTO, 2010)<sup>1</sup>. Several factors can influence countermeasure service life, including the following:

- Environment.
- Maintenance and rehabilitation activities.
- Replacement cycles.
- Operational and design context.
- Manufacturer specifications and warranties.

<sup>1</sup> American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1<sup>st</sup> Edition, 2010.



## Countermeasure Categories

The Guide organizes the countermeasures into functional categories so transportation practitioners can identify service lives quickly. The Guide's categories are consistent with those found in the CMF Clearinghouse. The list below includes the 19 categories and summarizes the range of **typical service lives** for associated countermeasures.

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| <ul style="list-style-type: none"><li>• Access Management (<b>20 years</b>).</li><li>• Advanced Technology and Intelligent Transportation Systems (ITS) (<b>10 years</b>).</li><li>• Alignment (<b>20 years</b>).</li><li>• Bicycle (<b>1-25 years</b>).</li><li>• Delineation (<b>1-5 years</b>).</li><li>• Highway Lighting (<b>15 years</b>).</li><li>• Interchange Design (<b>20 years</b>).</li><li>• Intersection Geometry (<b>1-20 years</b>).</li><li>• Intersection Traffic Control (<b>1-15 years</b>).</li><li>• Pedestrian (<b>1-30 years</b>).</li><li>• Resurfacing (<b>5-10 years</b>).</li><li>• Railroad Grade Crossings (<b>1-25 years</b>).</li></ul> | <ul style="list-style-type: none"><li>• Roadside (<b>10-25 years</b>).</li><li>• Roadway (<b>1-20 years</b>).</li><li>• Shoulder Treatment (<b>5-20 years</b>).</li><li>• Signs (<b>5-20 years</b>).</li><li>• Structures (<b>10-30 years</b>).</li><li>• Work Zone (<b>1 year</b>).</li><li>• Other (<b>10-30 years</b>).</li></ul> |
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## Applying Service Life Through BCA

A countermeasure's service life is an integral part of the BCA process and the assessment methodology for countermeasures with differing service lives impacts the outcome of the BCA. As such, it is important for transportation practitioners to select a consistent approach for comparing and ranking potential projects.

Chapter 5 of the Guide provides three examples that focus on the selection and application of the service life through BCA for safety projects. The first example focuses on the entire process of a BCA including selecting and implementing the countermeasure's service life when a transportation practitioner is evaluating two project alternatives. The second example demonstrates the service life selection and BCA for a new, single countermeasure where the service life is unknown. Finally, the third example provides an overview of using the service life and BCA for a countermeasure deployment using a systemic approach within a project.

## Availability

Access the Countermeasure Service Life Guide now at: [https://safety.fhwa.dot.gov/hsip/docs/FHWA-SA-21-021\\_Countermeasure\\_Serv\\_Life\\_Guide.pdf](https://safety.fhwa.dot.gov/hsip/docs/FHWA-SA-21-021_Countermeasure_Serv_Life_Guide.pdf).

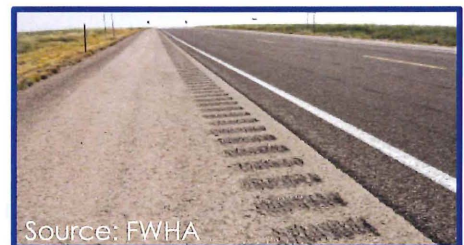
## DEVELOPING A SERVICE LIFE LIST

Agencies should consider developing a service life list. Similar to a [CMF list](#), a service life list offers the following benefits.

**Standardized values.** Creating standardized values can improve consistent application of BCA on proposed projects within an agency.

**Centralized source of information.** The standardized list may draw from an agency's internal experience with common countermeasures or from other agencies (e.g., when considering new countermeasures). The standardized list compiles known information about each countermeasure, providing a centralized source for practitioners.

**Improved communication with decisionmakers.** Along with CMFs, the standardized service life list can help practitioners communicate to decisionmakers the reasons for selecting a preferred countermeasure, especially if the countermeasure has not been commonly applied within the agency or within a specific region.



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