

# AASHTO Guide Manual for Bridge Element Inspection

First Edition • 2011



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American Association  
of State Highway and  
Transportation Officials

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## FOREWORD

This Manual is intended as a resource for agencies performing element level bridge inspections. It replaces the AASHTO Guide to Commonly Recognized Structural Elements (1994) and its interims as a reference for standardized element definitions, element quantity calculations, condition state definitions, element feasible actions, and inspection conventions.

AASHTO would like to recognize the dedication and tireless efforts of Michael B. Johnson of the California Department of Transportation and Paul Jensen of the Montana Department of Transportation in writing this manual.

AASHTO would also like to thank the following Steering Committee members for their support and guidance in developing this manual:

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## INTRODUCTION

The proper assessment of the condition of bridge elements is the cornerstone of sound bridge management. The introduction of element inspection condition methods in the early 1990s represented a significant advancement in the bridge inspection practice and has been adopted by the vast majority of all State Transportation Departments in the United States. Bridge owners nationwide have recognized the benefits of detailed condition assessments through the use of the raw inspection information, expanded performance measures, and bridge management system deterioration forecasting and evaluation. As the use of element level inspection techniques has proliferated, the need for improvements has been identified. This manual incorporates improvements through changes in the measurement units of decks and slabs, the development of a wearing surface element, the standardization of the number of element states, the development of a protective coating element, and the incorporation of expanded element Smart Flags. The goal of this manual is to completely capture the condition of bridges in a simple way that can be standardized across the nation while providing the flexibility to be adapted to both large and small agency settings. This manual is not intended to supplant proper training or the exercise of engineering judgment by the inspector or professional engineer.

# Section 1—Background

## 1.1—Condition Assessment Philosophy: Multi-Path And Defect Concepts

The Bridge Element Inspection Manual builds on the element level condition assessment methods developed in the AASHTO Guide for Commonly Recognized Structural Elements. Improvements have been made to fully capture the condition of the elements by reconfiguring the element language to utilize multiple distress paths within the defined condition states. The multi-path distress language provides the means to fully incorporate all possible defects within the overall condition assessment of the element. The overall condition of an element can be utilized in this aggregate form, or broken down into specific defects present as desired by the agency for Bridge Management System (BMS) use.

The Bridge Element Inspection Manual provides a comprehensive set of bridge elements that is designed to be flexible in nature to satisfy the needs of all agencies. The complete set of elements capture the components necessary for an agency to manage all aspects of the bridge inventory utilizing the full capability of a BMS.

The element set presented within includes two element types identified as National Bridge Elements (NBE) or Bridge Management Elements (BME). The combination of these two element types comprise the full AASHTO element set. All of the elements, whether they are NBE or BME, have the same general requirements:

1. Standard number of condition states
2. The standard number of condition states are comprised of good, fair, poor, and severe general descriptions

## 1.2—National Bridge Elements (NBEs)

The National Bridge Elements represent the primary structural components of bridges necessary to determine the overall condition and safety of the primary load carrying members. The NBEs are a refinement of the deck, superstructure, substructures, and culvert condition ratings defined in the Federal Highway Administration's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. Additional elements included in this section are bridge rail and bearings. The NBEs are designed to remain consistent from agency to agency across the country in order to facilitate the capture of bridge element condition at the national level.

## 1.3—Bridge Management Elements (BMEs)

Bridge Management Elements include components of bridges such as joints, wearing surfaces, and protective coating systems that are typically managed by agencies utilizing Bridge Management Systems. The BMEs represent a recommended set of condition assessment language that can be modified to suit the agencies needs as these elements are not intended to be utilized for the purposes of national policy making. The BMEs defined within this manual were purposefully left fairly general in nature to provide the flexibility to develop agency specific elements that best suit the local bridge preservation practices.

## 1.4—Agency Developed Elements

The elements presented within provide the flexibility for an agency to define custom elements in accordance with the defined element framework that can be subelements of NBEs, BMEs, or state defined elements without ties to the elements contained in this manual.

By defining a comprehensive set of bridge elements necessary for robust bridge management and the minimum set of elements necessary to assess the condition of primary components of bridges, the Bridge Element Inspection Manual provides a flexible element set that can be tailored to the needs of all agencies.