

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 23-494 (project 493) | March 2023

Incorporating Maintenance Costs and Considerations into Highway Design Decisions



the **ISSUE**

Maintenance costs sometimes may not receive full consideration as inputs to highway design decisions. Research is needed to identify priorities to evaluate maintenance and long-term costs associated with roadway systems.

the **RESEARCH**

In phase I, researchers identified their priorities after recommendations were formulated based on reviews of published literature, design policies, and practices, as well as a survey of design and maintenance personnel. As a result, four potential topics for further exploration were selected: 1) barrier type, 2) drainage, 3) cross sectional elements and temporary traffic control, and 4) intersections and interchange form and design. Discussions with the technical committee led to an initial big-picture analysis of barrier systems and related costs extracted from different DOT databases.

In Phase II, the research team accessed 10 years of detailed barrier-related work order data and transactional expenses from internal tracking and accounting systems. After data post-processing using custom search keys for free text fields and comparing different data sources, the initial, maintenance and project-related costs were extracted by barrier type. Repair and maintenance work associated with barrier damage caused by vehicle crashes was available and quantified, but only for cable barriers due to reporting information limitations in the work orders and accounting transactions. Adjustments for inflation using consumer price indices were applied to all costs for the analysis period, and a life-cycle cost analysis framework was illustrated for main barrier types.



A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

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North Dakota State University
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Project Title

Incorporating Maintenance
Costs and Considerations into
Highway Design Decisions

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the **FINDINGS**

This research identified relevant assets for further study on maintenance costs based on reviews of published literature, design policies, and practices, as well as a survey of design and maintenance personnel. An extensive effort to extract and analyze financial and expense records highlighted potential deficiencies in data management and granularity to effectively conduct life-cycle costs for analysis of asset costs.

the **IMPACT**

The research and case study will provide insight into improved maintenance data collection and identify issues and potential difficulties in tracking asset costs over time for conducting life-cycle costs analysis and evaluation of design alternatives.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1160>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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