

# RELIABILITY-BASED METHODOLOGY FOR BRIDGE INSPECTION PLANNING

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## **ABSTRACT**

This research program was created with the goal of improving bridge safety and reliability while also improving the allocation of bridge inspection resources. The research reported herein was completed as a part of a larger project with the objective of developing a recommended bridge inspection practice for bridges within the United States.

Traditionally, bridges in the United States are inspected at fixed time intervals of 24 months, with special programs in place to either extend or lessen this interval, based on certain conditions. This fixed inspection interval results in newer bridges, with little or no damage, being inspected with the same frequency as older, possibly more deteriorated bridges. This creates a situation where bridge inspection resources are allocated evenly across an inventory even though the inspection needs of certain bridges may be greater than others.

Through this research program, a bridge inspection planning methodology has been developed which is based on reliability theory and incorporates the knowledge and expertise of bridge owners to more rationally determine bridge inspection needs. The methodology is based on the determination of the likelihood of failure for specific bridge components based on design, loading, and condition characteristics and the perceived consequence of failure, based on an owner's expertise and experience. By combining these expressions of likelihood and consequence for each component, a maximum inspection interval for the entire bridge can be determined through the use of risk matrices.