Bridges: Life Cycle Costing

ANSWERED BY MALCOM THOMAS KERLEY, P.E., AND M. MYINT LWIN

Question: Do you incorporate life cycle costing into your decision-making process? If so, how?

SOME IMPORTANT QUESTIONS have complex answers and benefit from reflection and discussion. In this series designed to reflect that understanding, NSBA asks leading minds in the bridge community to weigh in on some of life's imponderables.

Answer: Malcom Thomas Kerley, P.E.

Chief Engineer, Virginia Department of Transportation

A simple answer to your question is yes. The how part of the answer is more complicated. Most states, if not all, use some form of life cycle costing philosophy in developing their projects. The American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA) support the use of life cycle costing in the development of projects. Both AASHTO and FHWA have sponsored research to identify best practices in life cycle cost analysis.

For example, the National Cooperative Highway Research Program's (NCHRP) Project 12-43, "Life-Cycle Cost Analysis for Bridges," produced NCHRP Report 483 and CRP-CD-26, which established guidelines and standardized procedures for conducting life cycle costing. Part II of the report is a Guidance Manual for use in either replacing existing bridges or evaluating new bridge alternatives. The FHWA website on Asset Management also provides guidance for improving investment decisions through life cycle cost analysis.

The AASHTO Highway Subcommittee on Bridges and Structures' "Grand Challenges: A Strategic Plan for Bridge Engineering" also addresses life cycle costing. Two of its challenges, Extending Service Life and Optimizing Structural Systems, address this subject. The use of new high-performance materials also impacts decisions in project selections.

States, all states, are interested in economical, long-lasting structures that are procured in a competitive environment. States look to minimize their future maintenance costs. In their decision-making processes, states consider life cycle costing philosophy and the assumptions they make impact their decisions.

Answer: M. Myint Lwin
Director of the Office of Bridge Technology, Federal Highway Administration

The Intermodal Surface Transportation Equity Act of 1991 (ISTEA) suggested the use of life cycle costing or life cycle cost analysis (LCCA) in the design and engineering of bridges, tunnels, and pavements. It was not until the National Highway System (NHS) Designation Act of 1995 that states were required to conduct an LCCA for each usable project on the NHS with a cost of $25 million or more. In support of the requirement, the FHWA issued a policy statement on LCCA in the September 18, 1996 Federal Register. The policy statement established LCCA principles to be applied by FHWA in infrastructure investment analysis, and provided a framework that states might use in conducting LCCA investment decisions. The importance of considering LCCA in various phases of project development, construction, maintenance, and operation was emphasized.

The Transportation Equity Act for the 21st Century of 1998 (TEA-21) rescinded the LCCA mandate of the NHS Designation Act of 1995. States were no longer required to perform LCCA. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) requires that states provide value engineering (VE) analysis or other cost-reduction analysis for a bridge project with an estimated total cost of $20 million or more; and any other project as appropriate. For major projects, more than one analysis may be required. The analyses for a bridge project must be evaluated on engineering and economic bases, taking into consideration acceptable designs for bridges, and using an analysis of life-cycle costs and duration of project construction.

The FHWA continues to develop LCCA practical tools and training materials in support of decision making in alternate design studies, construction costing, investments in inspection, maintenance, operation, preservation and management activities. The FHWA encourages the use of LCCA in all significant highway investment decisions. The short- and long-term benefits can be immense. MSC