Highway Bridges

Progress and Prospects

Introduction

The Silver Bridge spanning the Ohio River between Point Pleasant, West Virginia, and Gallipolis, Ohio, was designed and constructed during 1927–1928. It was the first eyebar suspension bridge in the United States. Forty years later, on December 15, 1967, it collapsed without warning into the river during the evening rush hour, killing 46 people. An engineering investigation later revealed that the collapse was caused by a cleavage failure at the head of one of the eyebars.

This dramatic and tragic event triggered a national emphasis on bridge safety. Previously, the emphasis in the United States had been on new bridge construction. The efforts of bridge engineers were not focused on systematic safety inspection of existing bridges because responsive maintenance, repair, and rehabilitation, performed on an as-needed basis, were deemed sufficient to address bridge safety issues.

The subsequent implementation of the National Bridge Inspection Standards (NBIS), issued in 1971, revealed that thousands of bridges in the United States required attention. Enormous amounts of resources and energy have since been expended to improve the condition of the nation's bridges.

The primary goal of this issue of *TR News* is to provide transportation professionals and the general public with an overview of the progress that has been made in bridge design, maintenance, and safety during the past 30 years. The various articles report on the condition of today's bridges and the progress being made in this area; describe some of the management, design, and evaluation tools being used by bridge engineers in improving the overall condition of our bridges; and examine bridge technology of the future.

This special issue of *TR News* is sponsored by the committees of the Structures Section within the Technical Activities Division of the Transportation Research Board, and represents the committees' collective effort to bring attention to the work and progress made in improving the condition of highway bridges in the United States. The work of the TRB committees and of the Structures Section Chairman, Andrzej Nowak, in developing and reviewing the articles is gratefully acknowledged.

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50 Years of Service

IVAN M. VIEST

The committees of the Structures Section in the Technical Activities Division of the Transportation Research Board have been providing a forum for gathering, synthesizing, and disseminating information on research and development of bridges for nearly 50 years. The first Committee on Bridges of the then Highway Research Board was established in 1949, and was chaired by Glen S. Paxson, bridge engineer, Oregon State Highway Commission. Paxson and the other five members of the committee were among the leaders in highway bridge research at the time.

Over the years the original, single bridge committee grew into several units with larger memberships. Today separate committees are responsible for such factors as concrete and steel bridge design, bridge foundations, bridge construction, dynamics and field testing of bridges, and use of structural fiber reinforced plastics in bridges. The most recent of the Structures committees is a task force on seismic design of bridges.

The committees provide an invaluable service to the industry. The most important accomplishment of the original HRB Committee on Bridges and its successors was the establishment of a forum for the entire highway bridge engineering community to present and debate the latest developments in the field. Other major accomplishments include:

- A large increase in HRB and TRB publications covering various aspects of bridge engineering technology, including *Bridge Aesthetics Around the World*, published in 1991; many volumes of the Transportation Research Record series; and proceedings of the TRB Bridge Engineering Conference.
- The inclusion of bridge research in the then American Association of State Highway Officials' Road Test Program, which led, for example, to the development of the load factor design and the load and resistance factor design. These designs replaced the time-honored but somewhat obsolete working stress design with separate consideration of service conditions and ultimate strength.
- The organization of four highly successful national bridge engineering conferences held in St. Louis in 1978, Minneapolis in 1984, Denver in 1991, and San Francisco in 1995. The fifth TRB Bridge Engineering Conference is being organized for the year 2000.

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