



0-7092: Synthesis of Bridge Deck Drains

Background

Runoff on bridges can be dangerous for vehicles if not drained properly. Bridge deck drains help remove runoff from bridge decks, but they tend to frequently clog. Frequent clogging of deck drains increases maintenance costs and threatens the safety of drivers. A comprehensive synthesis of the current state of knowledge and practice for bridge deck drains is necessary to identify the best practices that can help improve their performance. The objectives of this project are to synthesize and evaluate existing bridge deck drains and offer recommendations for their design, construction, and maintenance.

What the Researchers Did

The research findings were obtained through an extensive literature review, fact-finding surveys, and structured follow-up interviews. A thorough review of literature was conducted to obtain a detailed understanding of bridge deck drains in Texas and in states other than Texas. The findings of the literature review were used to develop two questionnaires, one for all TxDOT districts and another for all states other than Texas to capture the current state of practice for bridge deck drains. Responses were collected from 17 TxDOT districts and 21 states other than Texas. Figure 1 shows the locations of survey respondents. Based on the survey responses, structured follow-up interviews were conducted with individuals with the most experience with bridge deck drains. In total, the research team conducted six detailed follow-up interviews. The interview participants were asked to provide detailed information on bridge deck drain designs, construction, and maintenance.

What They Found

For example, some of the recommendations are summarized here:

- The design and detailing of closed bridge deck drains should be standardized. Detailed drawings eliminate difficulties that contractors and inspectors face on the job site.
- Since debris accumulates at bends, it is recommended to reduce the number of bends, use long radius elbows instead of short radius elbows, and provide a cleanout at each bend.
- Embedded systems' designs should start early during bridge design if they could not be avoided. Design decisions for bridges and embedded drains are interdependent.
- Bridge deck drains should be inspected at least once before each rainy season, especially on bridges with high amounts of debris.
- The drain section of the TxDOT bridge asset management system should be re-evaluated. Re-evaluation will ensure that adequate information about the conditions and performances of deck drains is collected to keep them performing well.
- Free-fall of runoff can be allowed when

Research Performed by:

University of Texas at Arlington

Research Supervisor:

Mohsen Shahandashti, PhD, PE

Researchers:

Shih-Ho (Simon) Chao

Nick Fang

Ahmad Bani-Hani

Anil Baral

Project Completed:

08-31-2021

