

LTBP News

LONG-TERM BRIDGE PERFORMANCE (LTBP) NEWSLETTER

WINNER OF THE 2023 STUDENT DATA ANALYSIS CONTEST

The Federal Highway Administration (FHWA) selected one paper for the first-place award in the Bridge category of the 2023 Long-Term Infrastructure Performance (LTIP) Student Data Analysis Contest. The student winner is Lawrencía Akuffo from Rowan University for “Quantification of the Correlation Between Bridge Skew Angle and Deterioration Rate.”

Ms. Akuffo received an all-expenses paid trip to attend the 2024 Transportation Research Board (TRB) 103rd Annual Meeting in January 2024. FHWA will recognize Ms. Akuffo with an award certificate at the LTBP Lectern Session during the TRB annual meeting and she will have the opportunity to present her paper during the LTBP session.

The [LTBP Session 2197](#) will be held Monday, January 8, 2024, from 3:45 to 5:30 p.m. in Room 206 of the Walter E. Washington Convention Center in Washington, DC.

The [LTIP Student Data Analysis Contest](#) encourages students to use the LTBP Web portal, [InfoBridge™](#),⁽¹⁾ and/or the Long-Term Pavement Performance (LTPP) Web portal, [LTPP InfoPave™](#),⁽²⁾ to address specific infrastructure issues or challenges. Entries for the 2024 contest are due August 1, 2024.

RESEARCH UPDATE

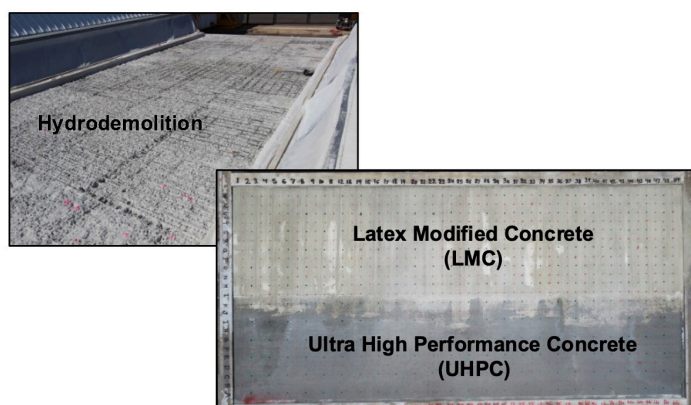
Full-Scale Accelerated Bridge Performance Testing

The LTBP Program has completed the first phase of testing on a full-scale steel girder bridge subjected to accelerated live and environmental loading at the Bridge Evaluation and Accelerated Structural Testing Laboratory at the Rutgers Center for Advanced Infrastructure and Transportation. The objectives of this research are to evaluate the long-term performance of reinforced concrete bridge decks, and the effectiveness of common overlay systems. Another objective is to determine and quantify the ability of nondestructive evaluation and structural monitoring to identify and track the deterioration of bridges.

During phase I, the bridge deck experienced the effects of 2 million passes of 60-kip tandem rolling load, 4,000 gal

of 6 percent brine solution application, and 85 rounds of freeze–thaw cycles, after which the deck was visually inspected, and a condition rating of 5 was assigned. Additionally, during phase I, 13 rounds of nondestructive test data were collected to assess deck deterioration.

Phase II of the research project is currently underway. Before initiating testing, the research team prepared the deck for the installation of overlays using hydrodemolition to remove deteriorated concrete to just below the top layer of reinforcement in the deck. Two overlays were chosen for assessment: latex-modified concrete (LMC) and ultra-high performance concrete (UHPC). Each overlay was placed side-by-side in the longitudinal direction, the longitudinal joint sealed, and accelerated environmental and live loading was initiated to study the performance of the overlays. As of September 2023, during phase II, the specimen has experienced approximately 2 million passes of live load in 6 different longitudinal positions (4 million total including phase I), 1,045 additional gal (5,045 total including phase I) of 6 percent brine application, and 55 additional freeze–thaw cycles (155 total including phase I). The visual inspection on March 21, 2023, rated the condition of the LMC deck as 7 and the UHPC deck as 8. The project is expected to continue through 2024.



Both images source: FHWA.

Figure 1. Phase II of accelerated bridge performance testing showing surface preparation with hydrodemolition and the completed overlays installed.

Bridge Deck Preservation Tool (BDPT)

Transportation Pooled Fund Project, TPF-5(474),⁽⁹⁾ focuses on developing a functioning bridge deck preservation portal to aid bridge owners and bridge engineers in data-driven decisionmaking on bridge deck preservation treatments to optimize efficacy and life-cycle cost. Project partners include Iowa Department of Transportation (DOT) (Lead), Indiana DOT, Minnesota DOT, Missouri DOT, New Mexico DOT, Texas DOT, and FHWA.

Phase I of the BDPT development project provided a systematic approach for predicting changes to bridge deck service life by combining physical characteristics, condition assessments, and user preferences and constraints with the application of specific bridge deck maintenance actions.

Phase II aims to develop a fully functioning cloud-based Web tool hosted on InfoBridge that improves the engineering-based functionality outlined in Phase I. The BDPT tool will incorporate the data and condition forecasting models in InfoBridge and relevant information from recently completed research projects. The BDPT tool will standardize the bridge deck maintenance process by assisting engineers with the logical selection of maintenance actions, thereby developing an optimized maintenance plan for a subject deck in user-defined service life.

INFOBRIDGE WEBINARS

LTBP staff provides on-demand, online webinars about [InfoBridge](#).⁽¹⁰⁾ InfoBridge users include bridge owners, researchers, consultants, and students. To date, several webinars have been presented to DOTs, researchers, university students, and professors. The webinar can be tailored to meet your needs. If you want to arrange a webinar for your colleagues, please contact shri.bhide@dot.gov.

RECENT PUBLICATIONS

1. *Corrosion-Induced Durability Issues and Maintenance Strategies for Post-Tensioned Concrete Bridges*. Report No. FHWA-HRT-22-090. Washington, DC: Federal Highway Administration. This report presents the research findings of a 3-yr synthesis study on four topics about corrosion-induced durability issues in grouted post-tensioned tendons and maintenance strategies to address these issues.
2. *Corrosivity of Water-Soluble Sulfate Ions in Simulated Pore Water Solutions and Different Types of Grout Samples*. Report No. FHWA-HRT-21-052. Washington, DC: Federal Highway Administration. This report presents research findings of an accelerated corrosion test program to determine the corrosivity of water-soluble sulfate ions in the simulated grout pore water and how these ions are present in various types of grout samples.

REFERENCES

1. FHWA. n.d. "LTBP InfoBridge™"(web page). <https://infobridge.fhwa.dot.gov/Home>, last accessed November 29, 2023.
2. FHWA. n.d. "LTPP InfoPave™"(web page). <https://infopave.fhwa.dot.gov/>, last accessed November 29, 2023.
3. National Cooperative Highway Research Program. 2023. "Transportation Pooled Fund—Study Details" (web page). <https://www.pooledfund.org/Details/Study/701>, last accessed November 29, 2023.

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