InfoBridge: Easy Access to the National Bridge Inventory and Much More—Part 1

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In January 2019, the Federal Highway Administration (FHWA) launched the Long-Term Bridge Performance (LTBP) InfoBridge web portal (https://infobridge.fhwa.dot.gov). This article, the first in a two-part series, offers a high-level overview of InfoBridge. Part 2 will delve into more advanced features.

What Is InfoBridge?

InfoBridge is a centralized gateway for quick and efficient access to bridge performance-related data and information. It includes tools to facilitate bridge data analytics and provides for storage, retrieval, dissemination, analysis, and visualization of data collected through state, national, and LTBP program efforts. Thus, the portal helps users holistically assess bridge performance on a network or individual bridge basis.

The user-friendly portal has intuitive features for finding, viewing, and analyzing bridge performance information. Users can also efficiently share data selections and summary reports. By enhancing our understanding of the performance of highway bridge assets, InfoBridge supports more efficient design, construction, rehabilitation, maintenance, preservation, and management of those assets.

InfoBridge was developed to advance the goals of the LTBP program, which is a long-term FHWA research effort to collect high-quality bridge data from a representative sample of highway bridges nationwide. The LTBP program—which is authorized by Congress under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users—helps the bridge community better understand bridge performance. Originally intended for researchers and state department of transportation bridge engineers, InfoBridge can benefit many others, including consulting engineers, local government asset managers, and transportation planners. Access to InfoBridge is free and does not require a username or password.
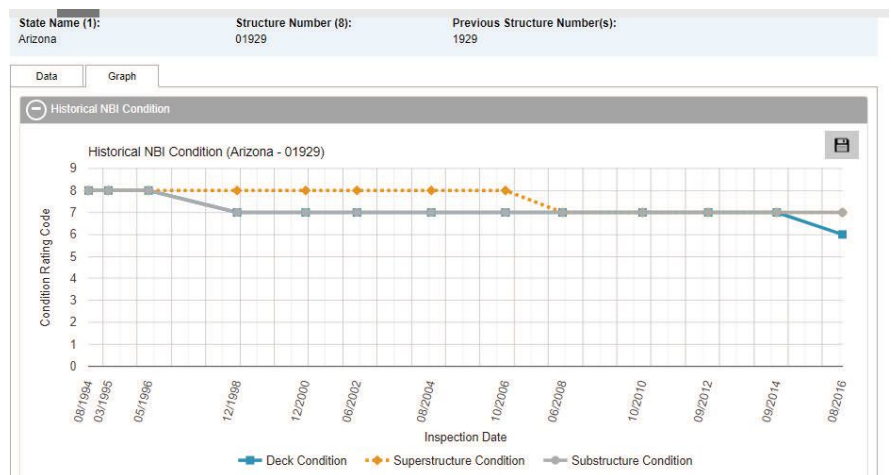
For a selected bridge, the Historical NBI Condition feature shows variance in condition rating codes for the bridge deck, superstructure, and substructure with respect to inspection date. All Figures: Federal Highway Administration.

Available Data

Three major data categories are currently available through InfoBridge:
- National Bridge Inventory (NBI) data: Since 1983, bridge owners have submitted NBI data to FHWA annually. Starting in 2015, National Bridge Elements (NBE) data for bridges located on the National Highway System have been included in the data set.
- Climate data: Annual climate data dating back to 1983 are available. Currently, data on the number of snowfalls and freeze-thaw cycles are included. Additional attributes will be added in future releases of InfoBridge. The source for climate data is the National Aeronautics and Space Administration (NASA) Modern-Era Retrospective Analysis for Research and Applications, Version 2 (MERRA-2).
- LTBP program data: This data set encompasses different types of data ranging from design and construction information on 1600 bridges to raw and processed non-destructive evaluation data for around 30 bridges, including contour plots displaying areas of deterioration.

In the future, FHWA will integrate other categories of data sets such as performance research results on weathering steel and timber bridges. Additional data will be obtained through cooperation with research efforts that collect bridge performance data.

InfoBridge Components and Features

InfoBridge includes multiple components and features that facilitate data viewing, visualization, and analytics. The basic features are described here.

Find Bridges

The *Find Bridges* feature consists of data filters within the categories of NBI, NBE, and LTBP data. Users can query the database and view the results in both a tabular format and on a map. Users can also see performance data and statistics on the dashboard or save query and filter criteria for future use.

Advanced Find

While the *Find Bridges* feature works for basic data attributes, the *Advanced Find* feature enables users to narrow their selection criteria by using all data attributes available under different categories. This feature works in conjunction with the *Find Bridges* feature, allowing users to perform sophisticated data searches on the available bridge data.

Map Find

The *Map Find* feature displays the selected bridges on an interactive map. Users can change the selection criteria using drawing tools and view the results on the map. This feature can be used independently or in conjunction with the *Find Bridges* and *Advanced Find* features to further refine the selected data set.

Performance Dashboard

The *Performance Dashboard* displays bar charts, tabulated summaries, and historical performance graphs corresponding to the set of selected bridges. It enables users to view performance summaries at a glance. As in all InfoBridge modules, the user can print or download the data displayed on the dashboard.
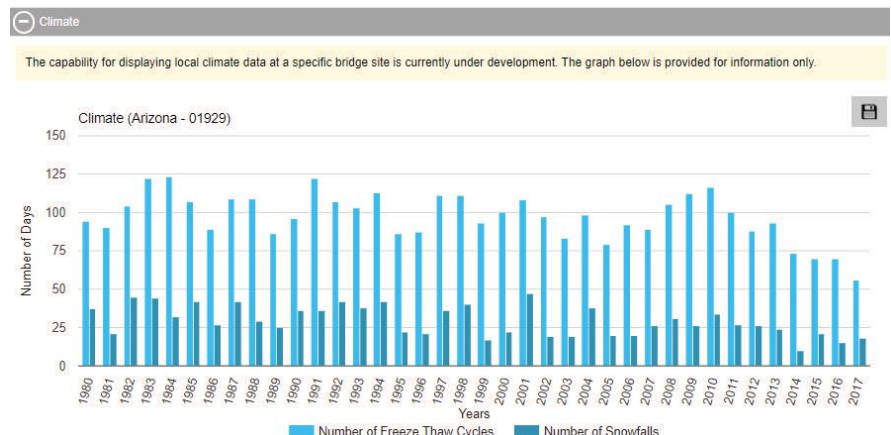
Bridge Information

Selecting a bridge from the *Selected Bridges* table or *Map* tab displays the bridge details under the *Bridge Information* section. This section is organized into categories with *Overview, NBI, NBE, Climate,* and *LTBP* tabs. The *Overview* tabVdisplays the key data attributes and overall extent of the data available for the selected bridge. The remaining tabs provide access to the bridge data for the corresponding data category. A *Bridge Summary Report* can be generated from the *NBI* tab for the selected bridge and a chosen submittal year.

Next Steps

In 2020, the LTBP program will incorporate bridge deterioration models into InfoBridge. One model will use historical NBI data to forecast future conditions of concrete bridge decks. The program is also conducting research on using a combination of statistical analysis techniques, namely, survival analysis and Markov chain theory, to accomplish this task. 🅰
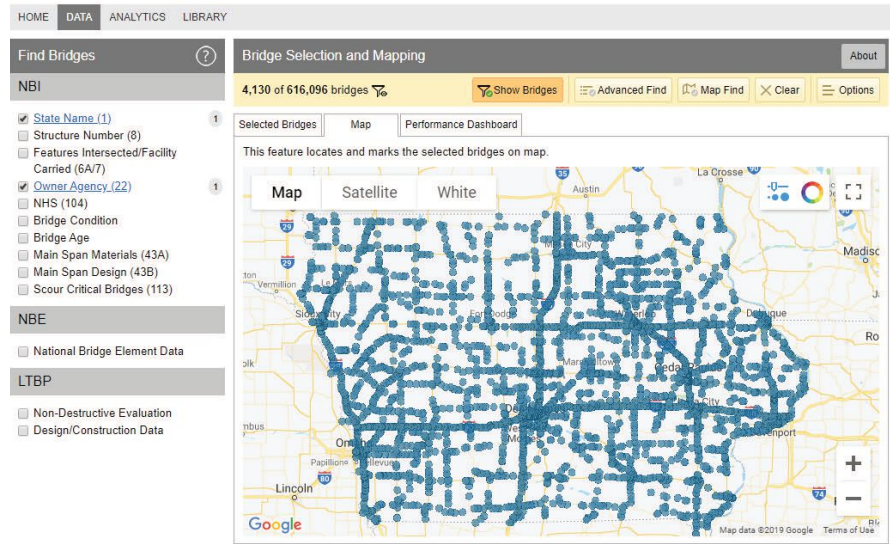
One of the InfoBridge search options enables users to locate and map bridges and conditions within selected criteria. For example, this map shows the results of a search for all bridges in the Iowa state highway system.

The Climate feature ultimately will show the number of annual freeze-thaw cycles and snowfalls at the selected bridge location.