

Field Implementation and Monitoring of an Ultra-High Performance Concrete Bridge Deck Overlay Dataset

Dataset available at: <https://doi.org/10.5281/zenodo.6539860>

(This dataset supports report **Field Implementation and Monitoring of an Ultra-High Performance Concrete Bridge Deck Overlay**, <https://doi.org/10.5281/zenodo.6539862>)

This U.S. Department of Transportation-funded dataset is preserved in the Zenodo Repository (<https://zenodo.org/>), and is available at <https://doi.org/10.5281/zenodo.6539860>

The related final report **Field Implementation and Monitoring of an Ultra-High Performance Concrete Bridge Deck Overlay**, is available from the National Transportation Library's Digital Repository at <https://rosap.ntl.bts.gov/view/dot/61977>.

Metadata from the Zenodo Repository record:

Title: Field Implementation and Monitoring of an Ultra-High Performance Concrete Bridge Deck Overlay

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Description: This project focused on field implementation of an ultra-high performance concrete (UHPC) overlay during rehabilitation of an existing concrete bridge (No. 7032) deck in Socorro, New Mexico, USA. Bridge 7032 is a two-lane bridge that is approximately 300 ft. (91.4 m) long and 54 ft. (16.5 m) in width. Rehabilitation of bridge 7032 included removal of deteriorated concrete from the existing deck, installation of a high-performance deck (HPD) leveling course, and installation of a 1 in. (25 mm) UHPC overlay. An UHPC mixture with a 19.5 ksi (134 MPa) compressive strength developed in previous research was selected for this project. This mixture was revised at the beginning of the project, highlighting the need for robust mixtures that can accommodate constituent material substitutions. Prior to placement of the UHPC overlay, the HPD substrate was ceramic bead blasted to remove surface paste and partially expose fine aggregate, thoroughly cleaned, and maintained saturated for 24 hours prior to UHPC placement. The non-proprietary UHPC overlay was successfully placed in four sections between April 10, 2021 and April 27, 2021. During construction of the UHPC overlay, a total of 105 batches were placed. The average direct tensile bond strength of the UHPC overlaid bridge deck was 239 psi (1.65 MPa), which is conservative since several of the tests had fractures that occurred at the epoxy-UHPC interface. Strain gauges and thermocouples were used to monitor the UHPC overlay and existing deck through initial, early-age, and longer-term monitoring programs. Temperature and strain monitoring showed that daily and multi-day strain trends coincided well with daily temperature trends. Major observations during this field implementation project were that four small areas of possible delamination were identified using non-destructive testing, the bond strength was good since the 239 psi (1.65 MPa) average was conservative, preliminary monitoring results were consistent with expectations based on temperature measurements and restraint provided by the concrete superstructure, and relative strains from the monitoring data are being used for detailed analysis of the bridge and overlay behaviors for an ongoing NMDOT project that runs for another two years.

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Dataset description:

This dataset contains 1 file collection described below.

Datasets-20220511T170921Z-001.zip:

- Datasets Folder
 - Data_Notes.docx
 - Data_Notes.pdf
 - Direct Tension Pull-off Test Data.xlsx
 - Early-age Monitoring Data.xlsx
 - Early-age Temperature Data.xlsx
 - Initial Monitoring Data.xlsx
 - Initial Temperature Data.xlsx
 - Longer-term Monitoring Data.xlsx
 - Longer-term Temperature Data.xlsx
 - UHPC Mixture Proportion and Strength Data.xlsx
 - UHPC Workability Data.xlsx

File Type Descriptions:

- The .docx file is a Microsoft Word file, which can be opened with Word and other free word processor programs, such as Kingsoft Writer, OpenOffice Writer, and ONLYOFFICE.
- The .pdf file format is an Adobe Acrobat Portable Document Format (PDF) file and can be opened with the Adobe Acrobat software.
- The .xlsx and .xls file types are Microsoft Excel files, which can be opened with Excel, and other free available software, such as OpenRefine.

National Transportation Library (NTL) Curation Note:

As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (<https://ntl.bts.gov/public-access>) Section 7.4.2 Data, the NTL staff has performed *NO* additional curation actions on this dataset. NTL staff last accessed this dataset at <https://doi.org/10.5281/zenodo.6539860> on 2022-05-27. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.