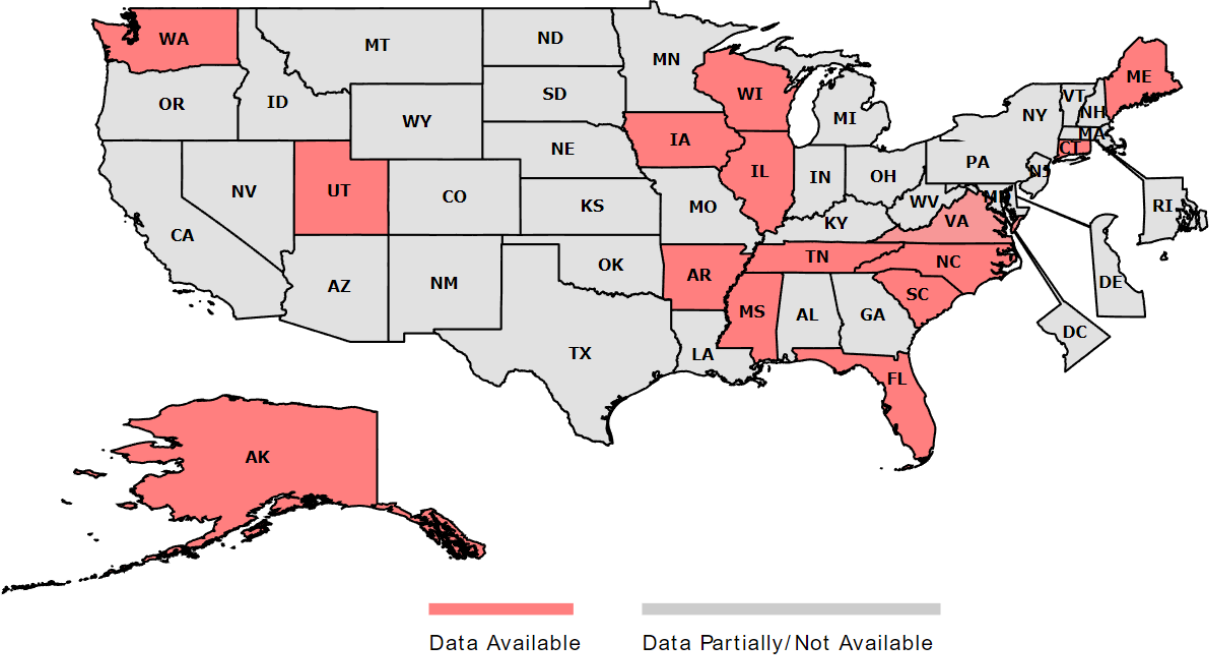


National Data Clearinghouse for Bridge and Tunnel Strikes (BrTS)

Basic Functionality User Guide



About

The User Guide is intended to provide an overview of the basic functions of the National Data Clearinghouse for Bridge and Tunnel Strikes (BrTS) Web Application. Developed with the ArcGIS Online Application, the data clearinghouse offers an interactive mapping interface to query and display crash and structure data, and collision risk from the participating states.

This web application aims to establish a national level data repository for collecting and analyzing bridge and tunnel strike data. It uses a data-driven method to assess the risk of a bridge or a tunnel strike by motor vehicles. This application can help state and local transportation engineers and planners to better assess, quantify and communicate the risk of bridge and tunnel-related crashes. Notably, the functionalities listed in this document are not exhaustive. The retrieved data can be exported to a comma-separated values (CSV) file, which is compatible with Microsoft Excel and ArcGIS. Users can learn how to view and query data in the "Stagewise Data Clearinghouse Web Interface" section of this Guide. To learn more about the tools used in the National Data Clearinghouse for Bridge and Tunnel Strikes (BrTS), users are encouraged to refer to ArcGIS Pro Online documentation.

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Getting Started

The welcome page provides links for the project information, the Bridge and Tunnel Strikes (BrTS) data clearinghouse application, and the option to request data.

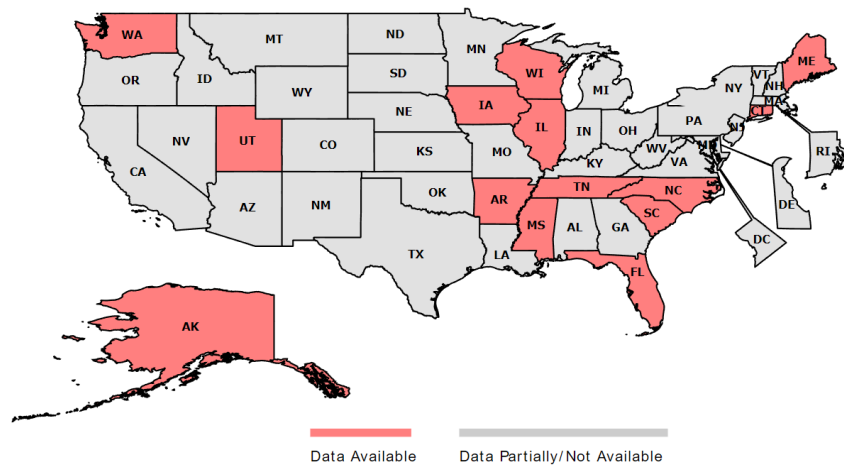
Products

National Data Clearinghouse for Bridge and Tunnel Strikes (BrTS) hyperlink directs to the project website that contains project information such as a general overview about the data clearinghouse, detailed information about the project, a user guide and the option to request data.

Submit your Data Request BrTS Data clearinghouse stores data in an ArcGIS geodatabase or in its original format. Some data forms and fields may be modified or omitted due to the constraint of the geodatabase. For original data, users can submit a data request.

Map

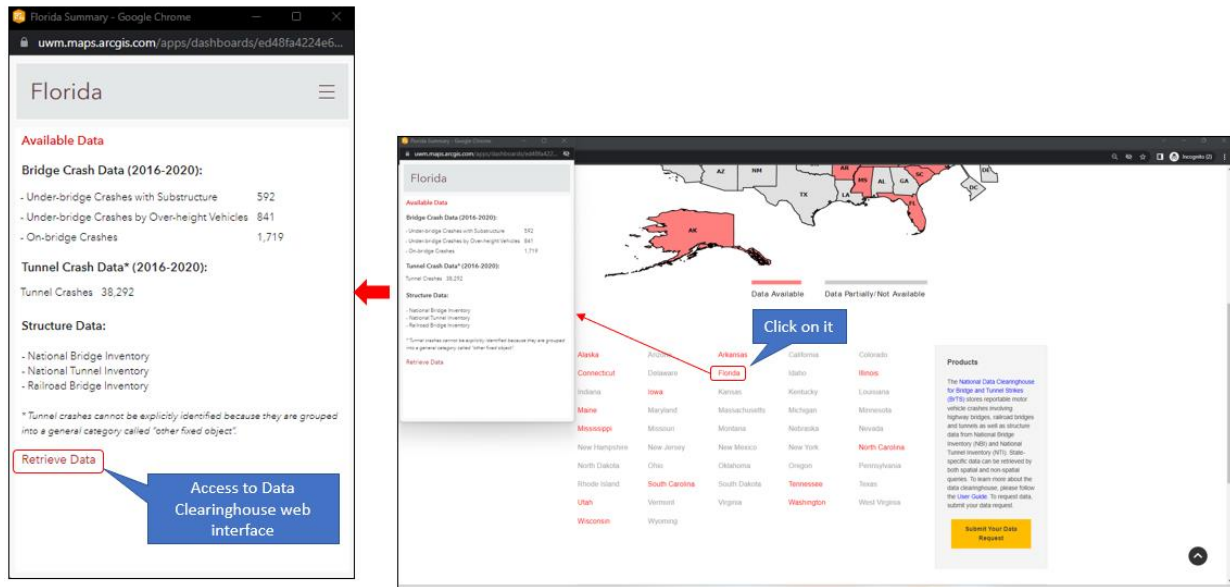
The Map displays two types of color codes: the red indicates that the data are readily available for direct



retrieval using the application; and the gray color indicates that the data are partially or not available for the state. To access to the data clearinghouse for a particular state, click on the state.

State List

An alternative way to access to the clearinghouse is via the list of state names located below the map. By clicking a state name, a pop-up dashboard will appear, display a summary of data for the state. A link of “Retrieve data” directs to the clearinghouse web interface.



After clicking “retrieve data”, the data clearinghouse web interface will appear within a small window that can be enlarged to full screen. After enlarging the window to a full screen mode, click the home button located in the upper left corner to navigate to the state.

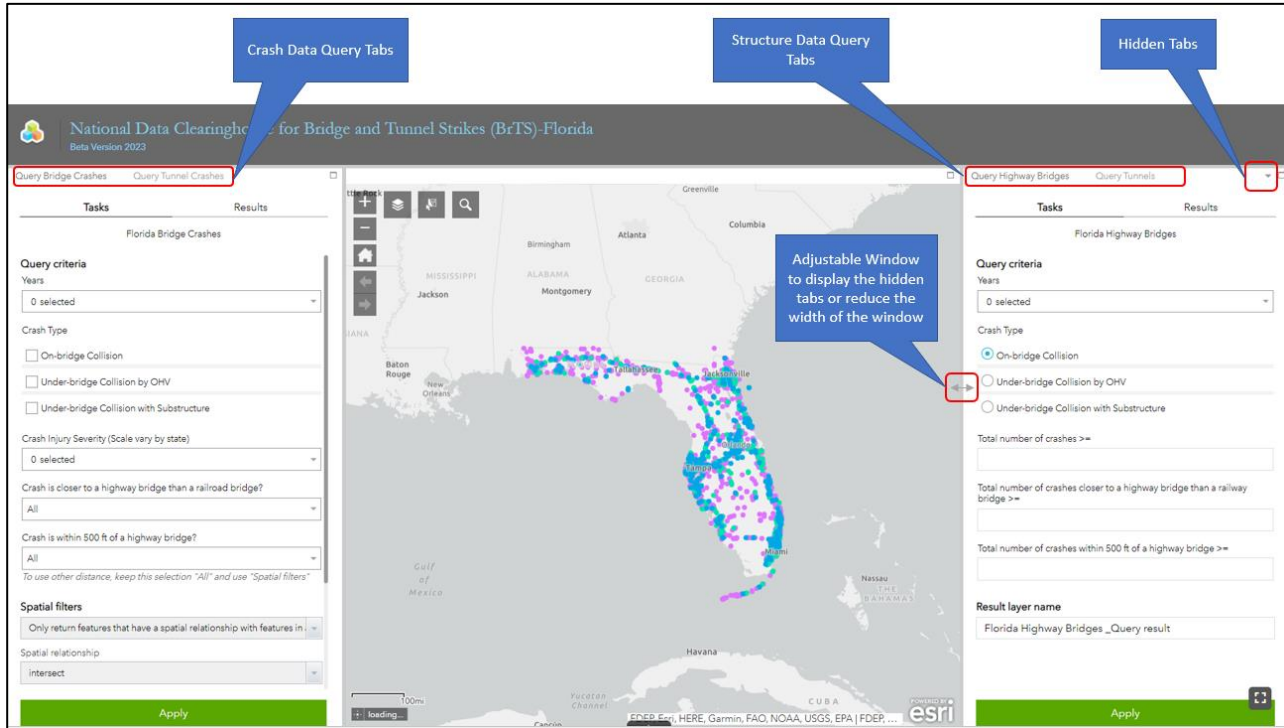
Stagewise Data Clearinghouse Web Interface

The default view of the web interface displays an empty US map. Users can turn on the layer from the “layer list” located in the tool menu on the map to gain a quick visual overview about the data. The key features of the application can be accessed through the **Basic Features**, **Crash Data Layer Tabs**, **Structure Data Layer Tabs**, and **Attribute Table Tabs**.

Basic Features

Layer list feature provides the layers that are available for the selected state. It contains crash data and structure data. Users are referred to *read more* from the ArcGIS Pro online documentation.

Search feature takes input of any real-world address to locate on the map.



Selection Features choose a layer and then generate a new layer from the selection. This new layer can be utilized as a relational layer in the spatial filters.

Crash Data Layer Tabs

The crash data query-related tabs can be found on the left side of the web interface. The tabs include "Query Bridge Crashes" and "Query Tunnel Crashes".

Each tab has two sub-tabs, "Tasks" and "Results". The "Tasks" tab encompasses all the query-related logic, while the "Results" tab displays the outcome. If a query is left in its default state for a specific field, the query outcome includes all data items in that field.

Query Bridge Crashes

Years- To query crashes for multiple years, use the dropdown menu to select the desired years.

Crash Types- To retrieve crashes by type, select one or more from the available options.

Crash Injury Severity (scale varies by state)- To retrieve crash data by injury severity, select one or more based on the available options. It is important to note that the values for injury severity may vary by state, with some using letters (A, B, C, etc.) and others using numbers (1, 2, 3, etc.).

Crash is closer to a highway bridge than a railroad bridge?- The available value options are "All", "No", and "Yes". In a data table, the field name used for this value is "DSCSRL". A value of 1 is "Yes", 0 is "No", and a Null or blank value is "Not Applicable".

Crash is within 500 ft of a highway bridge?- The available value options are "All", "No", and "Yes". In a data table, the field name used for this value is "DSLES500". A value of 1 in this field is "Yes", 0 is "No", and a Null or blank value is "Not Applicable".

Spatial Filters

Two types of spatial filter can be used:

Only return features that have a spatial relationship with features in another layer— The query results are determined based on the spatial relationship between the features in the query layer and those in the related layer. Additionally, a search distance can be applied to the geometries of the features in the related layer if desired. It is also possible to utilize the result layer of a previous query.

The screenshot shows the 'Query Bridge Crashes' interface. At the top, there are two tabs: 'Query Bridge Crashes' (highlighted with a red box) and 'Query Tunnel Crashes'. Below the tabs, there are two columns: 'Tasks' and 'Results'. The 'Tasks' column contains the title 'Florida Bridge Crashes'. The 'Results' column is empty. The main area contains the following sections:

- Query criteria**
 - Years: 0 selected
 - Crash Type
 - On-bridge Collision
 - Under-bridge Collision by OHV
 - Under-bridge Collision with Substructure
 - Crash Injury Severity (Scale vary by state): 0 selected
 - Crash is closer to a highway bridge than a railroad bridge?: All
 - Crash is within 500 ft of a highway bridge?: All
 - To use other distance, keep this selection "All" and use "Spatial filters"
- Spatial filters**
 - Only return features that have a spatial relationship with features in another layer
 - Spatial relationship: intersect
 - Related layer: (empty dropdown)
 - Apply a search distance to selected features
 - 1000
 - Feet
 - Result layer name: Florida Bridge Crashes _Query result

At the bottom, there is a green 'Apply' button.

This is a close-up of the 'Spatial filters' section from the previous screenshot. It shows the following options:

- Only return features that have a spatial relationship with features in another layer
- Spatial relationship: intersect
- Related layer: Florida Highway Bridges
- Apply a search distance to selected features
 - 1000
 - Feet
- Result layer name: Florida Bridge Crashes _Query result

Only return features that intersect with the shape drawn on the map— A set of drawing tools is available that allows users to draw shapes on the map to define a specific area of interest.

Query Tunnel Crashes

Years- To query crashes for multiple years, use the dropdown menu to select the desired years.

Crash is within 1500 ft of a Tunnel?- The available value options are "All", "No", and "Yes". In a data table, the field name used for this value is "CRS1500FT". A value of 1 in this field is "Yes", 0 is "No", and a Null or blank value is "Not Applicable".

Spatial Filters

Two types of spatial filter can be used:

Only return features that have a spatial relationship with features in another layer — The query results are determined based on the spatial relationship between the features in the query layer and those in the related layer. Additionally, a search distance can be applied to the geometries of the features in the related layer if desired. It is also possible to utilize the result layer of a previous query result (Same as query bridge crashes).

Only return features that intersect with the shape drawn on the map— A set of drawing tools is available that allows users to draw shapes on the map to define a specific area of interest (Same as query bridge crashes).

Structure Data Layers Tab

The structure data query-related tabs can be found on the right side of the web interface. They consist of the "Query Highway Bridge", "Query Tunnels", and "Query Railway Bridges" tabs. Each of these tabs contains two sub-tabs: "Tasks" and "Results". The "Tasks" tab includes all the query-related logic, while the "Results" tab displays the query result. If a query is left unchanged for a particular field, the query result includes all records for that field.

Query Highway Bridges

Years- To query crashes for multiple years, use the dropdown menu to select the desired years.

Crash Types- To query crashes by type, select one or more from the available options.

Total number of crashes >= Display the highway bridges that have a crash count equal to or greater than the integer value entered. In a data table, the field name used for this value is "SUM_DSALL".

Total number of crashes closer to a highway bridge than a railway bridge >= Display the highway bridges with crashes that are closer to a highway bridge than a railroad bridge. In a data table, the field name used for this value is "SUM_DSCSRL".

Total number of crashes within 500 ft of a highway bridge >= Display the highway bridges with crashes occurred within 500 ft. In a data table, the field name used for this value is "SUM_DSLES500".

The screenshot shows a web interface for querying highway bridges. At the top, there are two tabs: "Query Highway Bridges" (highlighted with a red box) and "Query Tunnels". Below the tabs are two sub-tabs: "Tasks" and "Results". The main content area is titled "Utah Highway Bridges" and contains the following sections:

- Query criteria**
 - Years**: A dropdown menu showing "0 selected".
 - Crash Type**: Three radio button options: "On-bridge Collision" (selected), "Under-bridge Collision by OHV", and "Under-bridge Collision with Substructure".
 - Total number of crashes >=**: An empty text input field.
 - Total number of crashes closer to a highway bridge than a railway bridge >=**: An empty text input field.
 - Total number of crashes within 500 ft of a highway bridge >=**: An empty text input field.
- Result layer name**: A text input field containing "Utah Highway Bridges _Query result".

At the bottom right, there is a green "Apply" button and a small square icon with a plus sign.

Query Tunnels

Years- To query crashes for multiple years, use the dropdown menu to select the desired years.

Total number of crashes within 1500 ft of a Tunnel >= Display the tunnels that have a crash count equal to or greater than the integer value entered, and within a 1500 ft radius of the tunnel. In a data table, the field name used for this value is "SUM_CRS1500FT".

Query Railway Bridges

Query Railway Bridges Query Highway Bridges

Tasks Results

Florida Railway Bridge

Query criteria

Years

0 selected

Crash Type

Under-bridge Collision by OHV

Under-bridge Collision with Substructure

Total number of crashes >=

Total number of crashes within 500 ft of a railway bridge >=

Total number of crashes closer to a railway bridge than a highway bridge >=

Result layer name

Florida Railway Bridge _Query result

Apply

Query Highway Bridges Query Tunnels

Tasks Results

Florida Tunnel

Query criteria

Years

0 selected

Total number of crashes within 1500 ft of a tunnel >=

Result layer name

Florida Tunnel _Query result

Apply

Years- To query crashes for multiple years, use the dropdown menu to select the desired years.

Crash Types- Select one or more from the available options.

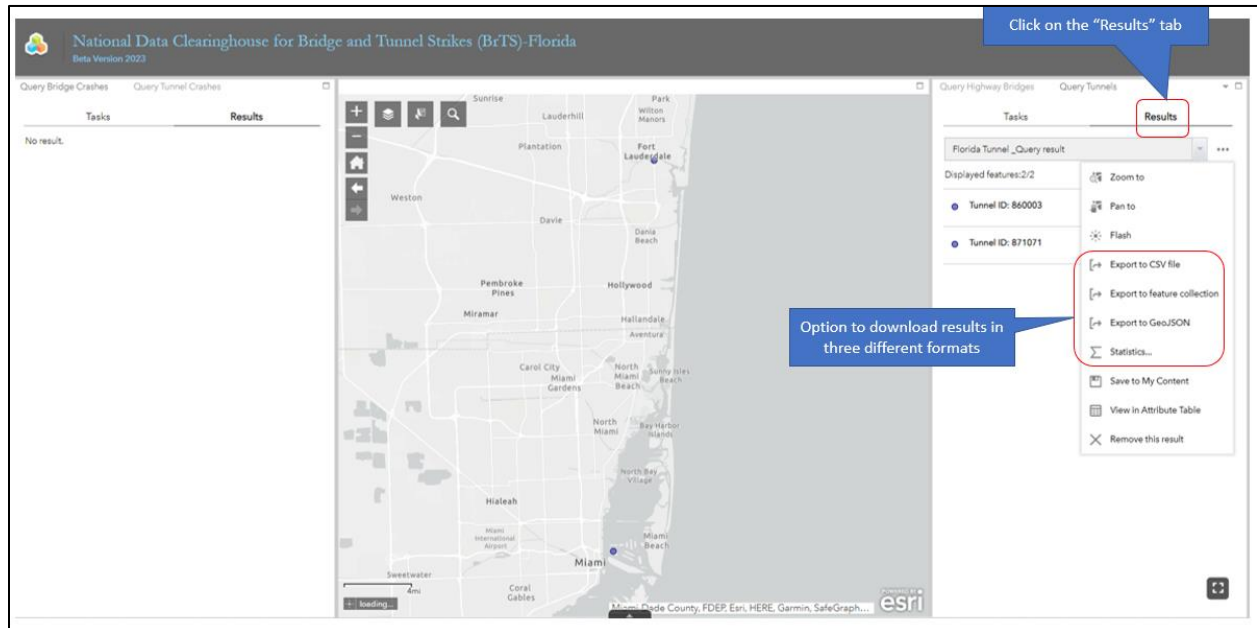
Total number of crashes >= Display the railroad bridges that have a crash count equal to or greater than the integer value entered. In a data table, the field name used for this value is "SUM_RLDSALL".

Total number of crashes within 500 ft of a highway bridge >= Display the highway bridges that have at least that number of crashes occurred within 500 ft. In a data table, the field name used for this value is "SUM_RLDSLES500".

Total number of crashes closer to a railway bridge than a highway bridge >= Display the highway bridges that have a crash count equal to or greater than the integer value entered, and where crashes are closer to a highway bridge than any nearby railway bridges. In a data table, the field name used for this value is "SUM_RLDSCSR".

Downloading Data

To access the options for the query results, follow these steps: generate the results by clicking the "Apply" button, then click on the "Results" tab. A dropdown window will appear, listing various available options. As shown in the image below, one of these options is to download the results in three different formats.



FAQs

1. Upon opening the application for a state, I do not see any available queries. Why is this?

Upon opening the application for a state, if no query is visible, it is likely because the application randomly chooses tabs to display. In some cases, data for a specific tab may not be fully available for that state, resulting in an empty tab. To access to available data, please use the other tab(s).

2. I visited the application for a particular state, but after opening the application of that state, it is not showing a query for a particular tab. Any reason for that?

Sometimes, the application does not load all the data layers properly. Therefore, you need to reload or re-open the application, which will solve this problem.

3. After running several queries, I have noticed that the application is becoming slow when processing new queries. Is there a reason for this and how can I prevent it?

If the application is getting slow with new queries after generating several queries, it may be due to the generated query results being stored in memory, which can degrade the application's performance. To avoid this issue, it is recommended not to keep adding too many query results or to delete the query result after use.

4. I have downloaded the data and noticed that there are some fields that I do not understand, as they are not defined in the raw data or in the User Guide. Where can I find information about these fields?

Data fields not defined in either the raw data or the User Guide are because they are for internal use only, and are necessary for further development of the application. Users are recommended to discard those fields.

5. Does the crash or structure data include all the data fields from the raw data?

The raw data is stored in ArcGIS geodatabase, which has a limit of 255 fields. Any fields located after the 255th field were discarded. However, it is not guaranteed that the raw data collected from state agencies contains all fields.

6. I have noticed that certain field formats are different than what I am familiar with for a specific state. Can you provide an explanation for this?

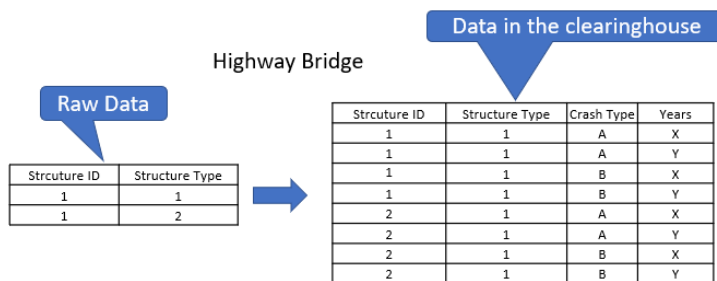
Some field formats may not be the same as what is expected for a particular state. This may be because the data collected from state agencies was in .EXCEL or .CSV format, and the original format of the data was not guaranteed in the raw data. ArcGIS automatically converted the field format to either text or double. However, some necessary fields have been standardized to help establish the relation with the raw data.

7. **When using "spatial filters" for a particular application, I experienced significant delay, and my browser displayed a time-out related message. I had to repeatedly click "wait" before getting the result. Can you explain the reason for this?**

Using ArcGIS "spatial filters" for a particular application can be slow and may cause a time-out message in the browser. This is because "spatial filters" is an expensive operation that consumes a lot of computation power. To avoid this issue, the crash distance from a structure (with the structure ID) has already been calculated and added to the data, so users can directly use those fields instead.

8. **Upon downloading the table, I found that the structure data contains replicated values, such as those in the highway bridge data for both Structure ID and Structure type. Can you explain how to use the data?**

Yes. It is correct. The structure data has been prepared as follows:



Other structure data has been implemented with the same schema.

9. **Is risk score for bridge available for the states?**

Currently, the risk score is only available for the state of Maine. For all other states, the risk score fields contain placeholder values.

For all other help, please contact to the NCHRP 08-139 project Team at <https://uwm.edu/ipit/contact/>, thank you!