

Finding the story: Bridge inspections

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Introduction:

We all walk, bike and/or drive on public bridges; trying to answer the question “how safe are our bridges?” leads to stories that are appealing to everyone, and can potentially save lives.

Whether covering the infrastructure beat, looking for a good investigative hook or covering breaking news, the National Bridge Inventory is a great resource for the story. The data has been used in the days following a bridge collapse (e.g. in [Minnesota](#) and [Washington](#)), and for general infrastructure reporting (e.g. in these national reports: [NBCNews](#) and [the Washington Post](#)).

The US Dept of Transportation is required to inventory all bridges that are open to the public, to assess the serviceability and safety of each bridge, and to report annually on the state of these bridges (<http://www.fhwa.dot.gov/map21/factsheets/bti.cfm>). Therefore the database can help you figure out the state of your local bridges, or if a bridge has collapsed, whether there were any warning signs that this might happen and if there are bridges with similar construction and ratings that might also be vulnerable.

Getting to know the data:

There are over 120 fields in the bridge inventory database, which include a sufficiency rating for the bridge (between 0 and 100), which is like a grade; the status of its superstructure, substructure and deck (terms you’ll need to get to know); the date of the last inspection; the estimated cost for repairs; the year it was built; and the year it was reconstructed (if applicable).

The database was created by engineers, so at first glance it can look a little daunting; there are a lot of codes and technical terminology. This is why it’s very important to read the documentation and know what you’re looking at before you start reporting the story. Below I’ve summarized some of the key fields.

Note that this references fieldnames as they are used by the version of the data available in the [NICAR data library](#); if you use the data straight from the [FHWA](#), the names will be slightly different.

- There can be more than one record for a single bridge, if there are routes both on and under the bridge. Use the record type - RECTYPE - to determine what route you’re looking at: a value of ‘1’ is on, everything else (‘2’ or ‘A’ - ‘Z’) is under.
- There are two status fields - STAT and STAT2 - that indicate whether the bridge is “structurally deficient” (1), “functionally obsolete” (2), or “not deficient” (0). You can read

about the difference between the two in the documentation, and more about each definition here: <http://www.fhwa.dot.gov/bridge/0650dsup.cfm>.

- The sufficiency rating - SUFFRATNO - is generated from a formula that takes into account the status of various components of the bridge; it is used to help determine if the bridge should be put on a list to be repaired or replaced. Generally speaking, if a bridge is considered “deficient”, a sufficiency rating below 80 is eligible for repair, and below 50 is eligible for replacement (see the above link).
- The superstructure (SUPER), substructure (SUBSTRUC) and deck (DECK) each receive a rating for their overall condition between 0 and 9. At or below a 4 is flagged; rating of 4 is considered “poor condition”, and anything below that is pretty bad. A rating of 1 means “imminent failure” and the bridge needs to be closed (and probably is already); a rating of 0 means that the bridge is closed and beyond repair.
- The inspection date - INSPDATE - gives you the month and the year that the bridge was last inspected. There’s also a field for inspection frequency - INSPFREQ - which tells you the number of months between each scheduled inspection.
- Use the average daily traffic - AVDAYNO - to gauge how much the bridge is used and how important it might be to local and regional routes. Consult the year of average daily traffic - YRAVG - to find out when the average was calculated.
- Make sure and check the status of the bridge - STRCSTAT - to find out if it’s open or closed.

Important caveat:

There’s a good chance that some of this data is already outdated when you receive it. Bridges may have been inspected, repaired or even replaced since the last update, so while you can use the data as a guide, you must follow up with the appropriate agency to get the most up-to-date information on particular bridges that you want to report on.

Where to start:

The best way to use the National Inventory of Bridges is to narrow down these 700,000+ records into a manageable list of bridges you can follow up on. Start by pulling out records of bridges in your state, county or city (you can ask the NICAR data library for help with this). You’ll want to be careful not to double-count bridges, so be conscious of the RECTYPE. One option is to look only at highway bridges, which are defined in the NBI record layout.

Note how many highway bridges there are in whatever geographic area you’re focusing on, so you can figure out what percentage are structurally deficient, and need to be repaired or replaced. (Use the documentation to define highway bridges)

Look at when your bridges were last inspected (according to the data); keep in mind that some bridges must have a non-scheduled inspection in the event of flooding, earthquakes, fires or collisions (as noted in the documentation). Are state inspectors able to keep up with scheduled inspections and special inspections?

When were the bridges built (YEAR)? How long are they expected to last? Have they been significantly reconstructed (YRRECNST)?

How many bridges are flagged for repair (SUFFRTNO < 80) or replacement (SUFFRTNO < 50)?

Here's how some experienced reporters have tackled the data and the reporting:

- Rank the bridges according to sufficiency rating, and focus on the ones that are below 40. (Tisha Thompson)
- Look at the rankings for the superstructure, substructure and deck: a rating of 2 is the worst where the bridge can still be open, but these have probably already been dealt with, so ones with 3s are a good place to start. (Tisha Thompson)
- Multiple years of this data are available from both NICAR and the FHWA, so look at how the inspection ratings have changed over time; are construction projects keeping pace with bridge deterioration? (MaryJo Webster)
- Ask for the physical documents of inspections for the last five years, which will probably get you two inspections; check to see if they've made the necessary repairs, or if "temporary fixes" (such as wooden braces) have become permanent fixes. (Tisha Thompson)
- Ask your state agency for a list of upcoming construction projects (which bridges, how much, when, extent of repair/replacement, etc). Beware that this might only be bridges that are owned by the state. (MaryJo Webster)
- Note who owns the bridges, and who is responsible for maintaining them; are there funds to maintain them? (Tisha Thompson)
- Look at bridges that are flagged as "fracture critical" in the CRITFRAC field: this means that the entire bridge can fail if there is failure at a key location (which is what happened to the [Skagit River Bridge in 2013](#)). (Cheryl Phillips)
- Talking to civil engineers about the construction of particular bridges (but be aware that they may have a stake in construction projects). (Tisha Thompson)