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Everything you wanted to know about bridges

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Good policy requires adequate data. When it comes to bridges, one public agency has a lot of data, and one private citizen has put it into a user-friendly format.

The Federal Highway Administration's "2006 Status of the Nation's Highways, Bridges, and Transit" (available at www.fhwa.dot.gov/policy) summarizes much of what we know about bridges. It draws on several other reports, including the National Bridge Inventory.

We learn, to start with, that there are nearly 600,000 bridges, or 594,101 to be exact. Nearly four out of five (77 percent) are in rural areas.

Oddly enough, 288 bridges are neither urban nor rural. They're "unknown." And if you plug the numbers of one table in the report into a spreadsheet you'll find a discrepancy involving of 633 urban bridges. So the FHWA has comprehensive, but not exhaustive knowledge. This apparent data problem is one clue that no human system is perfect.

One out of four bridges, the report says, are "deficient." That's a fairly broad term that encompasses two types of deficiencies. Roughly half are "structurally deficient" while the other half are "functionally obsolete."

It follows that not all deficient bridges are in imminent danger. "The fact that a bridge is 'deficient' does not immediately imply that it is likely to collapse or that it is unsafe."

An obsolete bridge, as you might expect, isn't up to the standards of the day. Much as your house can be perfectly habitable but lacking the features or qualities of today's new housing, a bridge can be safe for travel but obsolete by today's standards. A four-lane highway may be served by a two-lane bridge, for example. Or the shoulder width may have been met the design standards of a few decades ago, but not those of today. Our expectations of bridges, like everything else, change over time.

A bridge may also be "structurally deficient," a term you've heard a lot about lately. Bridges are given a measurement on a 10-point scale. A bridge becomes "structurally deficient" when one or more of its key components (deck, superstructure, substructure) earns a 4 or lower. Some "structurally deficient" bridges are more deficient than others. A 4 means a "poor condition" with "advanced section loss, deterioration, spalling [fragmentation], or scour." A score of 1 requires a bridge to be closed.

While one catastrophic failure captures our imagination and fears, the state of our nation's bridge inventory has actually improved in recent years. Granted, it could be a lot better, but between 1994 and 2004, the percentage of bridges that were "structurally deficient" declined from 19 percent to 13 percent.

The proportion of "deficient" bridges of all sorts declined from 33 percent to 27 percent between 1994 and 2004. Most of that decline has come through fixing structurally deficient rather than functionally obsolete ones. The trend is in the right direction, even if it's not moving as quick as we'd like.

Where are the deficient bridges? Overwhelmingly in rural areas, which generally receive less traffic. Nearly three-quarter of all deficient bridges (73 percent) are rural bridges. That's slightly less than rural areas' share of all bridges (77 percent).

Urban and rural areas don't have the same mix of deficient bridges. Rural bridges are more likely to be structurally deficient than obsolete (14 percent versus 11 percent), while the reverse is true of urban bridges (9 percent versus 22 percent). In urban areas, then, the greatest danger is not safety but congestion.

Bridges owned by local governments are much more likely (17 percent) to be structurally deficient than bridges owned by states (9 percent) or the federal government (9 percent).

Making Information Readable

Drilling through official data sources can be a complicated and confusing task, which is where private companies and even individuals come in. The web site National Bridges (www.nationalbridges.com) is the product of Alexander Svirsky, a Massachusetts resident with a keen interest in roads, bridges and trains. Every year he gets the latest version of the National Bridge Inventory from the FHWA and converts it into a searchable online database.

You can search for all the bridges in a state, only bridges along certain routes, or those in certain towns.

So you can find, for example, that there are 100 bridges in Saint Paul. The oldest one was built in 1926, while the newest came in 2004. Structurally deficient or functionally obsolete bridges are marked in red. Drill down on the information for the collapsed I-35W bridge and you'll find that it was marked as having a "satisfactory" (6) substructure, a "fair" (5) deck, and a "poor" (4) superstructure.

The site doesn't explain everything. If you don't know what "scour" means in the context of bridges, you'll have to look elsewhere. It is, though, a good start at making important data accessible.