Transportation for America

The Fix We're In For: The State of Our Nation's Bridges

TRANSPORTATION FOR AMERICA

Creative Commons cover photo by Flickr user wuji9981
http://www.flickr.com/photos/gswj/1120829179/

This report was written by Lilly Shoup, Nick Donohue and Marisa Lang, with additional contributions from Tanya Mejia, Sean Barry, David Goldberg and Stephen Lee Davis of Transportation for America in March 2011. Andrew Amey provided invaluable assistance compiling and analyzing the National Bridge Inventory data and Greg Vernon provided the GIS work. Our thanks also go to the U.S. DOT and FHWA for their cooperation. Released March 30, 2011.

Executive Committee

Smart Growth America (co-chair)
Reconnecting America (co-chair)
Alternatives for Community & Environment
America Bikes
American Public Health Association (APHA)
Apollo Alliance
LOCUS: Responsible Real Estate Developers and Investors
National Association of City Transportation Officials
National Association of Realtors
National Housing Conference
Natural Resources Defense Council
PolicyLink
Rails-to-Trails Conservancy
The Surface Transportation Policy Partnership
Transit for Livable Communities (Minn.)
U.S. Public Interest Research Group

About Transportation for America

Transportation for America (T4 America) is the largest, most diverse coalition working on transportation reform today. Our nation's transportation network is based on a policy that has not been significantly updated since the 1950's. We believe it is time for a bold new vision — transportation that guarantees our freedom to move however we choose and leads to a stronger economy, greater energy security, cleaner environment and healthier America for all of us. We're calling for more responsible investment of our federal tax dollars to create a safer, cleaner, smarter transportation system that works for everyone.

Contact Us

Transportation for America
1707 L Street NW, Suite 250
Washington, D.C. 20036
202.955.5543
info@t4america.org

Transportation for America

Contents

Creative Commons photo by Flickr user WSDOT http://www.flickr.com/photos/wsdot/4123364788/

The Fix We're In For: The State of our Nation's Bridges

America's infrastructure is beginning to show its age. Our nation's roads, highways and bridges have increasingly received failing scores on maintenance and upkeep – the American Society of Civil Engineers rated our overall infrastructure a "D" and our bridges a "C." For roads and highways, this manifests itself in rutted roadways, cracked pavement and abundant potholes, creating significant costs for drivers and businesses. For bridges, lack of maintenance can lead to the sudden closure of a critical transportation link or, far worse, a collapse that results in lost lives and a significant decline in regional economic productivity.

Despite billions of dollars in annual federal, state and local funds directed toward the maintenance of existing bridges, 69,223 bridges – representing more than 11 percent of total highway bridges in the U.S. – are classified as "structurally deficient," according to the Federal Highway Administration (FHWA). "Structurally deficient" bridges require significant maintenance, rehabilitation or replacement. A number of bridges also exceed their expected lifespan of 50 years. The average age of an American bridge is 42 years.

The maintenance backlog will only worsen as bridges age and costs rise. According to FHWA's 2009 statistics, $70.9 billion is needed to address

What Qualifies a Bridge as "Structurally Deficient?"

Highway bridges have three components: 1) the **superstructure**, which supports the deck; 2) the **substructure**, which uses the ground to support the superstructure; and 3) the **deck**, which is the top surface of the bridge that cars, trucks and people cross. During inspection, each of these bridge features is given a rating between 0 and 9, with 9 signifying the best condition. These individual ratings, as well as other factors, are combined to establish a bridge's overall "sufficiency rating," scored 1 to 100. Federal guidelines classify bridges as "structurally deficient" if one of the three key components is rated at 4 or less (poor or worse), meaning engineers have identified a major defect in its support structure or its deck. Deficient bridges require significant maintenance, rehabilitation or replacement. A state may have to restrict heavy vehicle traffic, conduct immediate repairs to allow unrestricted use or close the bridge to traffic until repairs can be completed. Federal law requires states to inspect all bridges 20 feet or longer at least every two years. Bridges in "very good" condition may go four years between inspections, while those rated "structurally deficient" must be inspected every year.

Sources: Federal Highway Administration. "Non-Regulatory Supplement." U.S. Department of Transportation. http://www.fhwa.dot.gov/legsregs/directives/fapg/0650dsup.htm#N_2_

Federal Highway Administration. "Conditions & Performance." U.S. Department of Transportation, 2006.

the current backlog of deficient bridges.[1] This figure will likely increase as many of our most heavily traveled bridges – including those built more than 40 years ago as part of the Interstate System – near the end of their expected lifespan.

The good news is that some states have worked hard to address the problem and have shrunken the backlog of deficient bridges. The bad news is that, critical as these efforts are, they are not nearly enough. Two key problems persist: **First**, while Congress has repeatedly declared bridge safety a national priority, existing federal programs offer no real incentives or assurances that aging bridges will actually get fixed. **Second**, the current level of investment is nowhere near what is needed to keep up with our rapidly growing backlog of aging bridges.

Our Nation's Bridge Backlog

Today, **one out of every nine** bridges that U.S. motorists cross each day is likely to be deteriorating to some degree. Nearly 70,000, or **11.5 percent**, of our **599,996** bridges nationwide are rated "structurally deficient," according to government standards. (*See box on "What qualifies a Bridge as 'Structurally Deficient.'"*)

1 SAFETEA-LU Funding Tables, FY2009, Table 3, Part 1, "Weighted Needs", p.27, http://www.fhwa.dot.gov/safetealu/fy09comptables.pdf

Creative Commons photo by Flickr user reallyboring. http://www.flickr.com/photos/reallyboring/4792346662/

Twenty-three states across the country have a higher percentage of deficient bridges than the national average of 11.5 percent. The five states with the worst bridge conditions all exceed a 20 percent share of structurally deficient bridges. **Pennsylvania** has the largest share of deteriorating bridges at **26.5 percent**, followed by **Oklahoma (22.0%)**, **Iowa (21.7%)**, **Rhode Island (21.6%)** and **South Dakota (20.3%)**.

At the other end of the spectrum, five states have less than 5 percent of their bridges rated as structurally deficient. **Nevada** leads the rankings at **2.2 percent**, followed by **Florida (2.4%), Texas (3.0%), Arizona (3.0%)** and **Utah (4.5%)**. **Table 1** shows all 50 states and the District of Columbia ranked by their percentage of structurally deficient bridges, with "1" signifying the worst conditions and "51" the best.

Table 1: State rankings, by percentage of structurally deficient bridges

Rank	State	Percentage structurally deficient	Number of structurally deficient bridges	Total number of bridges
1	Pennsylvania	26.5%	5,906	22,271
2	Oklahoma	22.0%	5,212	23,680
3	Iowa	21.7%	5,371	24,722
4	Rhode Island	21.6%	163	754
5	South Dakota	20.3%	1,193	5,890
6	Nebraska	18.2%	2,795	15,372
7	Missouri	17.0%	4,071	23,945
8	West Virginia	16.7%	957	5,734
9	North Dakota	16.1%	710	4,410
10	Mississippi	15.5%	2,650	17,063
11	New Hampshire	15.4%	372	2,408
12	Maine	15.4%	369	2,393
13	Michigan	13.1%	1,437	10,928
14	North Carolina	13.0%	2,353	18,099
15	South Carolina	13.0%	1,199	9,236
16	Wyoming	12.9%	395	3,060
17	Louisiana	12.9%	1,722	13,361
18	California	12.8%	3,135	24,542
19	Hawaii	12.4%	141	1,135

Rank	State	Percentage structurally deficient	Number of structurally deficient bridges	Total number of bridges
20	District of Columbia	12.3%	30	244
21	Alaska	12.2%	138	1,134
22	Vermont	12.0%	326	2,711
23	New York	12.0%	2,088	17,365
24	Kansas	11.1%	2,815	25,320
25	Massachusetts	11.0%	561	5,102
26	Indiana	10.6%	1,968	18,532
27	New Jersey	10.3%	674	6,517
28	Alabama	9.9%	1,592	16,017
29	Ohio	9.8%	2,743	27,963
30	Kentucky	9.5%	1,311	13,842
31	Virginia	9.4%	1,267	13,522
32	Connecticut	9.2%	383	4,182
33	Idaho	9.0%	373	4,130
34	Minnesota	8.8%	1,149	13,068
35	Illinois	8.5%	2,239	26,337
36	New Mexico	8.5%	330	3,902
37	Wisconsin	8.2%	1,142	13,982
38	Montana	7.6%	391	5,119
39	Arkansas	7.4%	930	12,572
40	Maryland	6.9%	359	5,176
41	Colorado	6.8%	576	8,490
42	Georgia	6.4%	941	14,649
43	Oregon	6.3%	456	7,249
44	Tennessee	6.2%	1,225	19,869
45	Delaware	5.8%	50	861
46	Washington	5.1%	394	7,744
47	Utah	4.5%	130	2,910
48	Arizona	3.0%	230	7,570
49	Texas	3.0%	1,551	51,277
50	Florida	2.4%	290	11,899
51	Nevada	2.2%	39	1,738
	National average	11.5%	62,936	577,725

Table 2: Overview of Nation's Bridge Statistics

	State system	Local system	Other	Structurally deficient	Total
Number of bridges	280,218	302,462	17,316	**68,842**	599,996
Bridge average annual daily traffic*	3,646,559,545	521,926,832	220,465,014	**282,672,680**	4,388,951,391

* Average annual daily traffic is the annual volume of vehicle traffic on a bridge, averaged out over 365 days to provide a daily average. Bridges may exceed this total on high traffic weekdays and carry less on Sundays, for instance.

Of the nation's approximately 600,000 highway bridges, 280,218 were state-owned in 2010; 302,462 were owned by counties, cities or towns; and 17,316 were owned by other entities, such as private businesses and federal agencies.[1]

Ownership of a particular bridge is significant because it often determines which jurisdiction is responsible for maintenance and repair. It is important to note, however, that federal bridge repair funds can be spent on any bridge in the National Bridge Inventory — all 600,000, no matter who owns the bridge. **Table 2** shows the number and average annual daily traffic on our nation's bridges.[2]

Nationwide, 77 percent of all bridges are in areas classified as rural. However, the 23 percent of bridges located in urban areas carry almost three-quarters of all national bridge traffic.[3] Both play an important role in our nation's transportation network. Rural bridges provide crucial access to jobs and medical services for residents in sparsely populated areas, while urban bridges carry high volumes and take a regular beating from commuter and commercial truck traffic. When urban bridges are in disrepair, they expose a larger number of people to danger each day.

For years, the federal government has run a special bridge repair program, but a combination of the program's shortcomings and the sheer growth in aging bridges has prevented its success. Between 1992 and 2010, the number of vehicles traveling across structurally deficient bridges declined just 2 percent, despite billions of dollars spent annually on bridge construction and repair.[4]

1 In this analysis, we use only highway bridges, since that is all that the National Bridge Inspection Program requires states to report in the National Bridge Inventory. Limited data is available for pedestrian bridges.

2 Average amount of traffic that crosses over the bridge each day

3 Research and Innovative Technology Administration. Highway Bridges in the United States — An Overview. http://www.bts.gov/publications/special_reports_and_issue_briefs/special_report/2007_09_19/html/entire.html

4 T4A Analysis of FHWA's National Bridge Inventory Data. http://www.fhwa.dot.gov/bridge/britab.cfm.

American motorists are regularly traveling across high-traffic bridges with "poor" ratings, meaning they are at risk of becoming dangerous or being closed without repair. Appendix B lists the top two most heavily used structurally deficient bridges in each state, ranked by average annual daily traffic (AADT) counts.

The accompanying state reports (http://t4america.org/resources/bridges) include maps of each state, with all counties shaded based on their percentage of structurally deficient bridges. Although smaller or more rural states have fewer bridges than more populated counties, this measurement allows for a fair cross-comparison between counties within a given state.

Needs are growing faster than the funding

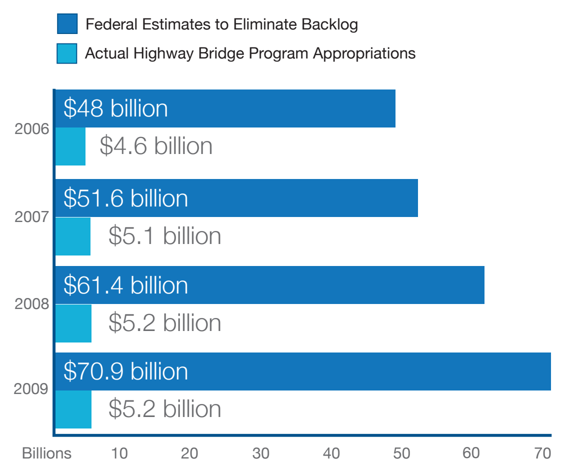
Congress created the Federal Highway Bridge Program to fix and replace deficient bridges throughout the country, but current funding is insufficient to keep up with rapid deterioration. **Figure A** compares the size of the bridge program from 2006 through 2009 with FHWA estimates of the sums needed to catch up on the current repair backlog. While appropriations have increased by $650 million, bridge needs over the same time period have increased by $22.8 billion.

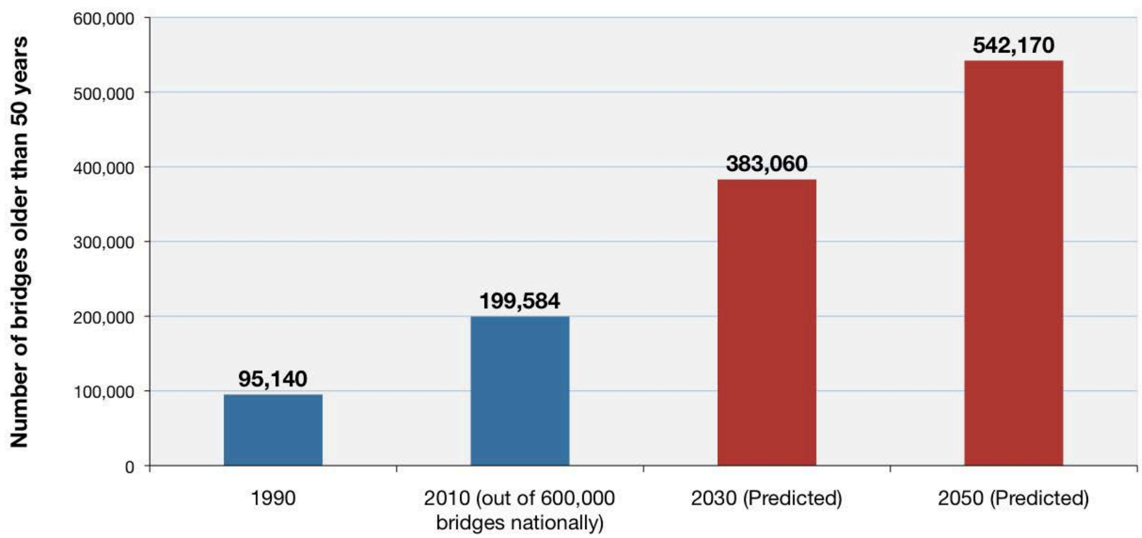
Regardless of the amount of wear and tear on a specific bridge, most bridges are designed to last roughly 50 years. The average age of bridges in the U.S. is **42 years old**. The number of structurally deficient bridges is virtually guaranteed to increase over time, as a wave of old bridges reach the end of their designed lives.

By the end of the last decade, nearly **200,000 of the nation's roughly 600,000 highway bridges** were 50 years old or older. By 2030, that number could double without substantial bridge replacement. At the current rates of aging and replacement, almost half of the nation's bridges will require major structural investments within the next 15 years.[2]

2 Bridging the Gap: Restoring and Rebuilding the Nation's Bridges. American Association of State Highway and Transportation Officials. July 2008. http://roughroads.transportation.org/

Figure A: Bridge Repair Funding Levels Versus FHWA Needs Estimate





The Tension Between Fixing the Old and Building the New

In recent years, most transportation agencies have delayed needed repairs and maintenance while focusing their energy on new construction. In 2008, all states combined spent more than **$18 billion, or 30 percent** of the federal transportation funds they received, to build new roads or add capacity to existing roads. In that same year, states spent **$8.1 billion** of federal funds on repair and rehabilitation of bridges, or about **13 percent** of total funds. States currently have the ability to "flex" or transfer out **up to 50 percent** of their bridge repair money into other projects or programs.

After decades of aggressive highway building, maintenance bills are mounting and coming due. The aging of bridges alone makes a compelling case for Congress to allocate a much larger share of funds toward rebuilding the existing system in the upcoming, six-year transportation funding bill.

Design Life?

In the past, most of our highway bridges were engineered with a 50-year design life. "Design life" refers to a bridge's expected lifespan, with regular maintenance performed to ensure that the strength and reliability of a bridge is not degraded due to unexpected traffic loads over the long-term. In the early days of the interstate system, this 50-year target ensured that bridges in the interstate system had similar designs and could be expected to last roughly the same amount of time, providing consistency across a national system.

Another term, called "service life," refers to a bridge's durability and depends on environmental conditions, quality of materials, design and construction and frequency of maintenance performed. Newer bridges have 75-100 year design lives.

States Cannot Keep Up Without Federal Support

Bridges provide crucial access between regions and cities, linking workers to jobs, goods to markets and people to essential services. According to the FHWA, transportation agencies would need **$70.9 billion** to overcome the current backlog of deficient bridges.[3] This investment would be money well spent, as poor bridge conditions have major implications for traveler safety, mobility and economic activity.

Allowing roads and bridges to slip into disrepair ultimately costs state and local governments billions more than the cost of regular, timely repair. Over a 25-year period, **deferring maintenance**

3 SAFETEA-LU Funding Tables, FY2009, Table 3, Part 1, "Weighted Needs", p.27. http://www.fhwa.dot.gov/safetealu/fy09comptables.pdf

Fixing Them First: Florida's Success Story

By prioritizing repair and maintenance of their existing structures and setting repair performance standards, Florida's Department of Transportation (FDOT) is providing some of the safest and highest-rated bridges in the country. Florida has the second lowest percentage of poorly rated bridges of any state in the U.S: only 290 out of 11,899 total bridges, or 2.4 percent, are classified as structurally deficient.

How has Florida managed this? Preserving existing infrastructure is one of three core principles of the FDOT. The agency defines "preservation" as ensuring that 80 percent of the pavement on the State Highway System meets department standards and that 90 percent of department-maintained bridges meet department standards. In order to meet these targets, state officials allocate funding for maintenance, repair and replacement projects before all other projects. The state uses data and analytical tools to determine the amount needed to meet the department repair standards.

Florida also has a specific state initiative to replace and repair bridges. The State Maintenance Office within FDOT develops an annual list of bridges to be replaced with funds from the State Bridge Replacement Program, while the State Bridge Repair Program is used to take care of periodic maintenance and specified rehabilitation activities. Each district receives funding based on its portion of the total state bridge inventory and uses a computer program to prioritize and manage repair.

Florida's practices of prioritizing repair and maintenance, tracking repair needs and setting measurable goals provide a template for success.

The Consequences of Deferred Maintenance

Losing a Vital Link: Crown Point Bridge Closing (NY-VT) On October 16, 2009, the Champlain/Crown Point Bridge linking New York and Vermont was closed without warning. An inspection for a rehabilitation or replacement process, slated for 2012, revealed that two of the bridge's support piers were not structurally sound. The bridge was a vital economic connection between the states, carrying about 3,500 cars across each day. Thousands of daily commuters now must drive about 100 miles out of their way to another bridge or pay at least $8 a trip for a ferry. A month after the closure, officials in Vermont and New York announced that the bridge was beyond repair and would have to be demolished. According to NPR, Jim Bonnie, with the New York Department of Transportation, said during a public meeting: "We set aside about $30 million a year for our bridge program, but we need on the order of $100 million to maintain our 830 bridges. So, it's just an epidemic."

When the Worst Happens: I-35W Collapse in Minneapolis On August 1, 2007, the I-35W Bridge in Minneapolis, Minnesota abruptly failed. The bridge fell into the Mississippi River, killing 13 people and injuring 145. Following the incident, the National Transportation Safety Board (NTSB) undertook a year-long investigation to determine the cause of the collapse. Though the "structurally deficient" bridge was being inspected every year, the NTSB found that the bridge design was flawed – its gusset plates were undersized and not meant to support the kind of loads the bridge was carrying. The cause of the collapse, in the NTSB's opinion, was the increased weight of the bridge itself due to previous modifications, and the concentrated weight of construction materials present on the deck of the bridge on the day of the collapse.

of bridges and highways can cost three times as much as preventative repairs. The backlog also increases safety risks, hinders economic prosperity and significantly burdens taxpayers.

Preservation efforts can also extend the expected service life of a road for an additional 18 years, preventing the need for major reconstruction or replacement.[4] In addition to the safety imperative, investing in the construction, expansion and repair of our nation's transportation infrastructure creates jobs today while laying the foundation for long-term economic prosperity. **Repair work on roads and bridges generates 16 percent more jobs than construction of new bridges and roads.**[5]

For all these reasons, Congress has repeatedly declared the condition and safety of our bridges to be of national significance. However, the current federal program does not ensure transportation agencies have enough money and accountability to get the job done.

4 American Association of State Highway and Transportation Officials. Bridging the Gap: Restoring and Rebuilding the Nation's Bridges. July 2008. http://roughroads.transportation.org/

5 Smart Growth for America. The Best Stimulus for the Money. www.smartgrowthamerica.org/stimulus.html

Recommendations

As our nation's bridges continue to age, Congress needs to provide states with increased resources to repair and rebuild them.

As the chart earlier in this report shows, the federal transportation program currently provides only a fraction of the funds needed for maintenance and repair. Although a number of states are making repair of existing assets a priority, more support from the federal government is essential. The nation's bridges are aging and traffic demands are increasing, even as state and local revenues are shrinking. Though the size of the federal program increased by 14 percent between 2006 and 2009, state-level needs increased at the same time by 47 percent.

Congress also must ensure funds sent to states for bridge repair are used only for that purpose.

Today, states can transfer bridge funds to other purposes – even if they have bridges clearly in need of repair. These funds should only be used for other purposes if the state's bridges are in a state of good repair. In addition, states should be given the flexibility to develop long-term programs that prioritize both keeping bridges in good condition and fixing or replacing deficient bridges. Even in instances where it is more cost-effective to perform regular repair on a bridge to prevent it from becoming deficient, the current federal program only allows states to fix a bridge that is structurally deficient with a low sufficiency rating.

Some states are already taking constructive steps to repair their infrastructure. These best practices could serve as a model for other states and complement an improved federal program. Michigan, for example, has greatly increased the ratio of spending on routine maintenance and pavement preservation vis-à-vis capacity increases and new roads by attempting to meet a goal of 95 percent of freeways and 85 percent of non-freeways in good condition by 2007, a goal established by Michigan's State Transportation Commission in 1997. The Florida Department of Transportation is bound by state statute that lists preservation as the first of three "prevailing principles," and sets maintenance standards for pavement and bridges.

Upgrade bridges so that they are safe and accessible for all who use them.

Congress should adopt a "complete streets" policy to ensure that when our aging bridges are replaced, they are designed to provide safe access for all who need them, whether in vehicles, on foot or bicycle, or using public transportation.

Appendix A: All 50 states + the District of Columbia ranked by percentage of bridges rated structurally deficient
Appendix B: The two busiest deficient bridges in each state + DC
Appendix C: The worst 100 U.S. counties, by percentage of deficient bridges

Appendix A: State bridge statistics, ranked by percentage structurally deficient

State	Total number of bridges	Number of deficient bridges	**Percent deficient**	Bridge average annual daily traffic	Average daily traffic on deficient bridges	Percent of daily bridge traffic on deficient bridges
PA	22,271	5,906	**26.5%**	129,881,848	22,773,880	17.5%
OK	23,680	5,212	**22.0%**	67,907,691	7,459,023	11.0%
IA	24,722	5,371	**21.7%**	32,277,265	2,324,224	7.2%
RI	754	163	**21.6%**	15,864,727	3,000,502	18.9%
SD	5,890	1,193	**20.3%**	6,848,545	314,902	4.6%
NE	15,372	2,795	**18.2%**	21,997,416	713,302	3.2%
MO	23,945	4,071	**17.0%**	84,592,901	5,946,151	7.0%
WV	5,734	957	**16.7%**	23,752,737	2,648,822	11.2%
ND	4,410	710	**16.1%**	4,741,813	112,165	2.4%
MS	17,063	2,650	**15.5%**	45,859,595	1,442,365	3.1%
NH	2,408	372	**15.4%**	17,386,850	2,141,826	12.3%
ME	2,393	369	**15.4%**	9,594,998	1,087,808	11.3%
MI	10,928	1,437	**13.1%**	89,862,500	8,764,101	9.8%
NC	18,099	2,353	**13.0%**	113,730,538	8,162,973	7.2%
SC	9,236	1,199	**13.0%**	44,140,233	3,292,993	7.5%
WY	3,060	395	**12.9%**	7,229,178	887,449	12.3%
LA	13,361	1,722	**12.9%**	74,404,236	3,682,931	4.9%
CA	24,542	3,135	**12.8%**	626,942,729	82,647,465	13.2%
HI	1,135	141	**12.4%**	27,657,486	1,800,369	6.5%
DC	244	30	**12.3%**	7,889,981	868,483	11.0%
AL	1,134	138	**12.2%**	3,626,809	179,337	4.9%
VT	2,711	326	**12.0%**	6,830,008	568,281	8.3%
NY	17,365	2,088	**12.0%**	181,001,105	15,096,756	8.3%
KS	25,320	2,815	**11.1%**	44,138,365	877,487	2.0%
MA	5,102	561	**11.0%**	119,948,269	10,408,421	8.7%
IN	18,532	1,968	**10.6%**	90,464,071	5,726,593	6.3%
NJ	6,517	674	**10.3%**	153,593,901	11,324,590	7.4%
AL	16,017	1,592	**9.9%**	77,858,906	3,309,811	4.3%
OH	27,963	2,743	**9.8%**	181,057,148	11,157,457	6.2%
KY	13,842	1,311	**9.5%**	66,169,161	4,502,538	6.8%
VA	13,522	1,267	**9.4%**	118,392,491	6,758,887	5.7%
CT	4,182	383	**9.2%**	78,693,395	4,482,324	5.7%
ID	4,130	373	**9.0%**	14,382,845	851,067	5.9%
MN	13,068	1,149	**8.8%**	51,254,528	2,436,031	4.8%

State	Total number of bridges	Number of deficient bridges	**Percent deficient**	Bridge average annual daily traffic	Average daily traffic on deficient bridges	Percent of daily bridge traffic on deficient bridges
IL	26,337	2,239	8.5%	129,139,813	8,136,203	6.3%
NM	3,902	330	8.5%	39,079,605	1,271,760	3.3%
WS	13,982	1,142	8.2%	77,922,959	3,482,032	4.5%
MT	5,119	391	7.6%	10,194,762	416,335	4.1%
AR	12,572	930	7.4%	47,549,796	1,759,104	3.7%
MD	5,176	359	6.9%	91,673,308	4,613,962	5.0%
CO	8,490	576	6.8%	68,989,943	5,117,359	7.4%
GA	14,649	941	6.4%	143,682,818	2,360,875	1.6%
OR	7,249	456	6.3%	44,500,068	1,833,653	4.1%
TN	19,869	1,225	6.2%	147,559,059	4,827,711	3.3%
DE	861	50	5.8%	11,069,734	378,556	3.4%
WA	7,744	394	5.1%	66,977,581	2,861,030	4.3%
UT	2,910	130	4.5%	36,695,611	995,705	2.7%
AZ	7,570	230	3.0%	100,564,735	1,255,229	1.2%
TX	51,277	1,551	3.0%	501,629,011	3,610,004	0.7%
FL	11,899	290	2.4%	204,124,188	1,750,483	0.9%
NV	1,738	39	2.2%	27,624,131	251,365	0.9%
US Total	**599,996**	**68,842**	**11.5%**	**4,388,951,391**	**282,672,680**	**6.4%**

Appendix B: Top two busiest structurally deficient bridges, by state

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
AL	Jefferson	I65	U.S.11,RR&CITY STREETS	33.504222, -86.816142	146,620
AL	Mobile	I-10 WB & EB	HALLS MILL CREEK	30.60455, -88.148617	86,370
AK	Anchorage Municipality	LAKE OTIS ROAD	CAMPBELL CREEK, LAKE OTS	61.178333, -149.838333	25,249
AK	Ketchikan Gateway Borough	SOUTH TONGASS HWY	WATER ST VIADUCT	55.345, -131.65	17,864
AZ	Maricopa	I 17	19th Avenue	33.429113, -112.099804	119,000
AZ	Maricopa	I 17	11th Ave & SFRR	33.429042, -112.087358	118,000
AR	Pulaski	LOCUST ST & S FT R	U.P.R.R.	34.762583, -92.261417	116,000
AR	Pulaski	I 30-SEC 23	SH100 SH10 RR ARK RIV	34.746667, -92.263333	116,000
CA	Los Angeles	INTERSTATE 10	NORMANDIE AVE	34.036667, -118.298333	321,000
CA	Los Angeles	I 10 & RAMPS	3 CONN, & 8 CITY STREET	34.026667, -118.25	304,000
CO	Denver	I 25 ML	RDWY,RR,SOUTH PLATTE RVR	39.743, -105.015611	203,000
CO	Denver	I 70 ML	HAVANA ST, UP RR	39.775278, -104.865833	183,000
CT	New Haven	INTERSTATE-95	WEST RIVER & SR 745	41.283333, -72.936667	141,200
CT	New Haven	INTERSTATE-95	WEPAWAUG RIVER	41.236667, -73.058333	136,600
DE	New Castle	I 95	CHRISTINA RIVER	39.7186, -75.579919	128,371
DE	New Castle	SR 141	CHRISTINA R.,AMTRAK,SR 4	39.712094, -75.608294	66,774
DC	District of Columbia	14TH STREET, NB	POTOMAC RIVER & OHIO DR	38.875, -77.04	93,100

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
DC	District of Columbia	Key Bridge	POTOMAC RIVER	38.901667, -77.07	62,000
FL	Duval	I-95 (SR-9)	HENDRICKS/KINGS/MONTANA	30.313853, -81.652603	172,000
FL	Pinellas	I-275 NB	TAMPA BAY	27.917778, -82.615	73,750
GA	Clayton	I75 SB R TO I285 E	MUD CREEK	33.631129, -84.402466	145,980
GA	Coweta	I-85 (NBL)	TRANSCO GAS LINES	33.434486, -84.711564	66,130
HI	Honolulu	HALONA ST	KAPALAMA CANAL	21.326887, -157.867291	183,925
HI	Honolulu	NORTH FRONTAGE RD	LAKESIDE #2-ALA AOLANI	21.360154, -157.899274	112,315
ID	Canyon	I 84 EBL	UPRR;EAST NAMPA OP	43.598056, -116.543889	59,500
ID	Canyon	I 84 WBL	UPRR;EAST LATERAL CANAL	43.600278, -116.568333	55,500
IL	DuPage	I-290	SALT CREEK	41.940225, -87.985206	162,400
IL	Cook	I-290 IKE(CONGRESS	BETWEEN RIV & PO	41.875689, -87.636747	139,000
IN	Marion	I-465 SBL	BIG EAGLE CREEK	39.8, -86.275	93,385
IN	Marion	I-465 NBL	US 136 & ABANDONED RR	39.801168, -86.275399	93,385
IA	Polk	I-35 & I-80	DRAINAGE DITCH	N/A	82,100
IA	Woodbury	I-29	FLOYD RIVER	42.483681, -96.391382	41,200
KS	Johnson	FAU 2724 (SM PKWY)	TURKEY CREEK TRIBUTARY	39.014739, -94.710239	42,800
KS	Johnson	FAU 2724 (SM PKWY)	TURKEY CREEK	39.01485, -94.700778	42,800
KY	Jefferson	I-64 RAMP	ML WB I64 & RIVER ROAD	38.260222, -85.740764	144,000

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
KY	Jefferson	I-64 RAMP	I-64 EB & WITHER-SPOON ST	38.259694, -85.741986	144,000
LA	Orleans Parish	US0090B	R/R, CITY STS	29.94958, -90.084532	69,360
LA	Jefferson Parish	I0010	VET MEM HWY	30.005295, -90.208225	61,740
ME	Oxford	ROUTE US 2	WILD RIVER	44.391389, -70.98	30,493
ME	Cumberland	CUMBERLAND STREET	PRESUMPSCOT RIVER	43.683056, -70.351389	18,341
MD	Baltimore	IS 695	MD 26	39.348333, -76.745	190,204
MD	Baltimore	IS 695	MILFORD MILL ROAD	39.36, -76.746667	190,204
MA	Middlesex	I 93	HWY RIVERSIDE AVE	42.416261, -71.104533	169,000
MA	Essex	US 1 NEWBRPRT TPK	I 95 /ST128	42.516456, -71.001872	156,700
MI	Wayne	SECOND BLVD	I-94	42.361483, -83.072436	146,000
MI	Wayne	I-94 TO W GR BLV R	OPEN AREA	42.346383, -83.110497	119,000
MN	Ramsey	I 35E	PENNSYLVANIA AVE	44.961467, -93.09095	154,000
MN	Ramsey	I 35E	BNSF RR	44.96369, -93.090806	149,000
MS	Warren	I 20	MISSISSIPPI RIVER	32.314211, -90.906544	29,400
MS	Covington	US 49	UNNAMED STREAM	31.760748, -89.669863	21,000
MO	St. Louis	IS 270 E	WATKINS CR	38.770095, -90.221679	93,127
MO	Platte	IS 29 S	RT AA	39.188333, -94.605	84,781

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
MT	Cascade	US 89,MT-3, MT-200	MISSOURI RV, U5205, BNSF	47.493369, -111.311844	37,280
MT	Missoula	CITY STREETS	CLARK FORK	46.876197, -114.018656	22,370
NE	Douglas	PACIFIC ST/FAU5044	BIG PAPILLION CREEK	41.248806, -96.07913	42,300
NE	Douglas	N85	BNSF RR 073-047-W	41.19858, -96.042995	30,140
NV	Clark	I 15	US 95	36.174194, -115.154789	148,200
NV	Washoe	VIRGINIA ST	TRUCKEE RVR	39.524942, -119.812681	20,570
NH	Rockingham	I-93 SB	NH111A	42.799594, -71.272103	77,000
NH	Rockingham	I-93 SB	BMRR(ABD)	42.918958, -71.373508	75,000
NJ	Camden	I-76	NEWTON CK,KLEMM AV&CONRL	39.891448, -75.105715	191,940
NJ	Morris	RT I-287	EDEN LN,RVR&MORR&ERIE RR	40.820067, -74.444	179,557
NM	Sandoval	I-25 NBL/SBL	Sandia Wash	35.263333, -106.561667	67,449
NM	Doña Ana	I-10 WBL	UNNAMED WATERWAY	32.166056, -106.663639	30,839
NY	Richmond	RTE I278	RELIEF	40.612222, -74.029333	169,791
NY	Kings	RTE 907C	ROCKAWAY PARK	40.630408, -73.885864	148,480
NC	Forsyth	US52	28TH STREET	36.123889, -80.23225	76,000
NC	Forsyth	US52	25TH STREET	36.122, -80.232056	76,000
ND	Cass	US 10/MAIN AVENUE	US 81/10TH STREET	46.875, -96.793333	24,100

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
ND	Cass	US HIGHWAY 10	SHEYENNE RIVER	46.876667, -96.906667	13,780
OH	Hamilton	IR 75	MARSHALL AVENUE	39.132169, -84.532594	162,790
OH	Franklin	I 70	OVER FISHER RD	39.972686, -83.078753	146,370
OK	Oklahoma	I-40	FAU 9341 (WESTERN) UNDER	35.464086, -97.526278	106,700
OK	Tulsa	I-244 EB RAMP W-N	I-244 WB UNDER	36.165839, -95.858792	83,600
OR	Multnomah	I-5 (HWY 001)	IOWA STREET VIADUCT	45.479986, -122.678919	139,800
OR	Multnomah	I-5 (HWY 001)	WILLAMETTE RIVER MARQUAM	45.507672, -122.669331	135,900
PA	Montgomery	PA TURNPIKE(I-276)	SR0263;DB-160,DB-160W	40.161667, -75.111667	85,801
PA	Philadelphia	DELAWARE EXPWAY.	SERGEANT & HUNTING-DON ST	39.968861, -75.127556	74,938
RI	Kent	I-95	JEFFERSON BLVD	41.756, -71.436333	156,400
RI	Providence	I-95	TAFT ST & SEEKONK RIVER	41.87338, -71.384847	121,600
SC	Charleston	I-26	S.C.642	32.853111, -79.987625	86,100
SC	Richland	I-26	C.N. AND L. RAILROAD	34.026389, -81.101944	79,900
SD	Minnehaha	41ST STREET	BIG SIOUX RV	43.515019, -96.766631	28,160
SD	Minnehaha	49TH STREET	BIG SIOUX RV	43.508181, -96.759281	18,174
TN	Hamilton	I75	BIG SPRING CREEK	35.001183, -85.210733	121,400
TN	Davidson	I24	I24 / WOODLAND STREET	36.17, -86.766667	116,160

State	County	Bridge facility	Crosses	Lat/Long	Average Daily Traffic
TX	Harris	IH45 NB	WHITE OAK BAYOU	29.777475, -95.368167	119,320
TX	Galveston	IH45	DRAINAGE DITCH	29.49185, -95.107378	94,520
UT	Salt Lake	I-15 (SR-15) NB&SB	SR-89 SB.,UPRR & LOC. RD.	40.815417, -111.920722	103,255
UT	Davis	I-15 (SR-15) NBL	SR-93, 2600 SOUTH in NSL	40.861222, -111.902	75,545
VT	Bennington	VT 0007A ALT	W. BRANCH BATTEN KILL R.	43.176389, -73.0575	14,800
VT	Chittenden	US 00002 ML	I 89 UNDER US 2	44.59, -73.170278	13,800
VA	Richmond city	Interstate 95	Westwood Ave.	37.578333, -77.466667	150,982
VA	Richmond city	Interstate-95/I-64	Route 161 (Boulevard)	37.576667, -77.463333	150,982
WA	Spokane	I-90	HAVANA ST	47.654056, -117.346806	109,988
WA	Spokane	I-90	ALTAMONT ST	47.653333, -117.375	107,710
WV	Kanawha	INTERSTATE 64	US60, WV25, KANAWHA RV.	38.360385, -81.716223	78,000
WV	Kanawha	I-77 SBL.	CR 119/37 SURFACE DR	38.383333, -81.616667	31,750
WI	Milwaukee	IH 43-N-S FREEWAY	RAMP IH 43NBL-STH 57	43.091667, -87.921667	101,300
WI	Milwaukee	IH 43-N-S FREEWAY	CMSTPP RR	43.093333, -87.921667	100,300
WY	Campbell	WYO 59	DONKEY CREEK	44.266654, -105.49377	19,800
WY	Sheridan	I-90 BUS	LITTLE GOOSE CREEK	44.785886, -106.942935	19,200

Appendix C: 100 worst U.S. counties

State	County	Bridges rated structurally deficient	Total # of bridges in county	**County % rated deficient**	State average
Nebraska	Nemaha	120	194	**61.9%**	18.2%
Massachusetts	Dukes	3	5	**60.0%**	11.0%
Rhode Island	Bristol	3	5	**60.0%**	21.6%
Nebraska	Pawnee	102	187	**54.5%**	18.2%
Oklahoma	Grant	260	516	**50.4%**	22.0%
Pennsylvania	McKean	104	216	**48.1%**	26.5%
Pennsylvania	Potter	90	188	**47.9%**	26.5%
South Dakota	Clark	10	21	**47.6%**	20.3%
Nebraska	Otoe	166	355	**46.8%**	18.2%
Iowa	Adams	94	202	**46.5%**	21.7%
Oklahoma	Pawnee	88	195	**45.1%**	22.0%
Pennsylvania	Clearfield	129	286	**45.1%**	26.5%
Nebraska	Hayes	20	45	**44.4%**	18.2%
Iowa	Winnebago	49	111	**44.1%**	21.7%
Nebraska	Greeley	42	96	**43.8%**	18.2%
Pennsylvania	Lawrence	112	257	**43.6%**	26.5%
Iowa	Davis	91	210	**43.3%**	21.7%
West Virginia	Pocahontas	36	85	**42.4%**	16.7%
Nebraska	Thurston	69	164	**42.1%**	18.2%
Oklahoma	Logan	131	313	**41.9%**	22.0%
Oklahoma	Creek	177	423	**41.8%**	22.0%
Pennsylvania	Schuylkill	151	361	**41.8%**	26.5%
Nebraska	Wayne	104	254	**40.9%**	18.2%
Oklahoma	Lincoln	209	511	**40.9%**	22.0%
Missouri	Daviess	104	257	**40.5%**	17.0%
Pennsylvania	Monroe	119	297	**40.1%**	26.5%
Missouri	Holt	73	183	**39.9%**	17.0%
Georgia	Marion	18	46	**39.1%**	6.4%
Iowa	Lucas	79	203	**38.9%**	21.7%
Iowa	Plymouth	208	535	**38.9%**	21.7%
Oklahoma	Kingfisher	131	339	**38.6%**	22.0%
Iowa	Keokuk	80	209	**38.3%**	21.7%
West Virginia	Marshall	26	68	**38.2%**	16.7%

South Dakota	Turner	53	140	**37.9%**	20.3%
Iowa	Taylor	96	255	**37.6%**	21.7%
Mississippi	Amite	87	234	**37.2%**	15.5%
Oklahoma	Alfalfa	149	401	**37.2%**	22.0%
South Dakota	Sanborn	23	62	**37.1%**	20.3%
Nebraska	Johnson	62	169	**36.7%**	18.2%
South Dakota	Bon Homme	49	135	**36.3%**	20.3%
South Dakota	Tripp	33	91	**36.3%**	20.3%
Mississippi	Carroll	83	229	**36.2%**	15.5%
Nebraska	Stanton	82	227	**36.1%**	18.2%
Kansas	Decatur	65	181	**35.9%**	11.1%
Kentucky	Leslie	34	95	**35.8%**	9.5%
Pennsylvania	Cameron	20	56	**35.7%**	26.5%
Oklahoma	Haskell	55	155	**35.5%**	22.0%
Iowa	Boone	48	136	**35.3%**	21.7%
Iowa	Guthrie	97	276	**35.1%**	21.7%
Nebraska	Loup	7	20	**35.0%**	18.2%
Iowa	Monroe	52	149	**34.9%**	21.7%
Mississippi	Sunflower	62	178	**34.8%**	15.5%
Pennsylvania	Wyoming	47	135	**34.8%**	26.5%
Mississippi	Wilkinson	41	118	**34.7%**	15.5%
Iowa	Van Buren	58	167	**34.7%**	21.7%
Nebraska	Jefferson	81	234	**34.6%**	18.2%
Kentucky	Clay	55	159	**34.6%**	9.5%
Missouri	Shelby	38	110	**34.5%**	17.0%
Missouri	Cedar	39	113	**34.5%**	17.0%
California	San Francisco	40	116	**34.5%**	12.8%
South Dakota	Dewey	10	29	**34.5%**	20.3%
South Dakota	Sully	10	29	**34.5%**	20.3%
Oklahoma	Garfield	202	586	**34.5%**	22.0%
Iowa	Warren	93	270	**34.4%**	21.7%
Pennsylvania	Fayette	127	369	**34.4%**	26.5%
Pennsylvania	Butler	128	372	**34.4%**	26.5%
Kansas	Rawlins	43	125	**34.4%**	11.1%
Oklahoma	Osage	125	364	**34.3%**	22.0%
West Virginia	Pendleton	29	85	**34.1%**	16.7%
Indiana	Sullivan	74	218	**33.9%**	10.6%
Kansas	Jewell	130	383	**33.9%**	11.1%

Louisiana	East Carroll Parish	23	68	**33.8%**	12.9%
North Dakota	Williams	33	98	**33.7%**	16.1%
North Carolina	Rockingham	76	226	**33.6%**	13.0%
Iowa	Adair	107	319	**33.5%**	21.7%
Iowa	Jefferson	55	164	**33.5%**	21.7%
Missouri	Polk	57	170	**33.5%**	17.0%
Mississippi	Attala	83	248	**33.5%**	15.5%
West Virginia	Randolph	52	156	**33.3%**	16.7%
West Virginia	Wetzel	29	87	**33.3%**	16.7%
Oklahoma	Okmulgee	106	319	**33.2%**	22.0%
Mississippi	Lafayette	88	265	**33.2%**	15.5%
Pennsylvania	Armstrong	88	265	**33.2%**	26.5%
Pennsylvania	Juniata	55	166	**33.1%**	26.5%
Pennsylvania	Elk	38	115	**33.0%**	26.5%
Kansas	Phillips	92	280	**32.9%**	11.1%
Mississippi	Quitman	40	122	**32.8%**	15.5%
Missouri	Caldwell	67	205	**32.7%**	17.0%
West Virginia	Tucker	16	49	**32.7%**	16.7%
Iowa	Tama	118	362	**32.6%**	21.7%
Missouri	Carroll	128	393	**32.6%**	17.0%
Louisiana	West Carroll Parish	37	114	**32.5%**	12.9%
North Dakota	Hettinger	23	71	**32.4%**	16.1%
Pennsylvania	Washington	199	615	**32.4%**	26.5%
California	Madera	74	229	**32.3%**	12.8%
Iowa	Ringgold	82	254	**32.3%**	21.7%
Iowa	Hancock	50	155	**32.3%**	21.7%
Kansas	Smith	107	332	**32.2%**	11.1%
Oklahoma	Kay	134	416	**32.2%**	22.0%
Pennsylvania	Greene	97	302	**32.1%**	26.5%