Transportation for America

The Fix We're In For: The State of West Virginia's Bridges

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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 has rated our country's 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 due to increased wear and tear on their vehicles. For the nation's bridges, lack of maintenance can result in the sudden closure of a critical transportation link or, far worse, a collapse that results in lost lives and a significant loss 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 – are classified as "structurally deficient," according to the Federal Highway Administration (FHWA.) "Structurally deficient" bridges require significant maintenance, rehabilitation or replacement. In addition, a number of bridges 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 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 seen their backlog of deficient bridges shrink in number. The bad news is that, critical as these efforts are, they are not nearly enough. Two key problems persist: (1) An absence of real incentives and assurances at the federal level that fixing aging bridges is a top funding priority; (2) Federal investment in fixing the nation's infrastructure is not currently tied to performance and accountability measures, leaving Americans no concrete assurances of progress. As bridges continue to age and fall into disrepair, our nation's policymakers must make a greater commitment to maintaining and repairing these crucial assets.

West Virginia's Bridge Backlog

Out of 50 states and the District of Columbia, West Virginia ranks 8th nationally in terms of the overall condition of the state's bridges. (1 being the worst, 51 being the best.)

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

Today, one out of every six bridges that motorists in West Virginia cross each day are likely to be deteriorating to some degree; and 16.7 percent of bridges statewide are rated "structurally deficient" according to government standards, compared to 11.5 percent nationwide.

As of 2010, West Virginia had 5,734 highway bridges: 5,488 of them owned by the state; 101 owned by local counties, cities and towns; and 145 owned by other entities, such as private business and federal agencies.[2] Ownership of a particular bridge matters because it often determines which jurisdiction is responsible for maintenance and repair. Table 1 shows the number and average annual daily traffic[3] on West Virginia's bridges.

What Qualifies a Bridge as "Structurally Deficient?"

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.

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. 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.[1] If a bridge is rated "structurally deficient," the bridge requires significant maintenance, rehabilitation or replacement. A state may restrict heavy vehicle traffic, conduct immediate repairs to allow unrestricted use or close the bridge to traffic until repairs can be completed.

*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.

[2] 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
[3] Average amount of traffic that crosses over the bridge each day.

Table 1: Overview of West Virginia Bridge Statistics

	State system	Local system	Other	**Structurally Deficient Bridges**	**Total**
Number of bridges	5,488	101	145	**957**	**5,734**
Bridge average annual daily traffic	21,482,266	237,164	2,033,307	**2,648,822**	**23,752,737**

Rural bridges often provide crucial access to jobs and medical services for residents in sparsely populated areas. Urban bridges, on the other hand, carry high volumes of traffic to and within regional economic centers. Most bridges in the National Highway System are in rural areas, but urban bridges carry more traffic. Nationally, rural bridges account for 77 percent of all bridges. However, the 23 percent of bridges in urban areas carry almost three-quarters of all national bridge traffic.[4]

Between 1992 and 2010, the number of vehicles traveling across structurally deficient bridges on a daily basis was virtually unchanged (-2 percent), despite billions of dollars spent annually on bridge construction and repair.[5] An increasing number of American individuals and businesses rely on bridges that are subject to closure or weight restriction if increased maintenance and reconstruction are not undertaken — a potentially crippling impact on personal travel and freight movement.

Drivers in West Virginia are regularly traveling across heavily trafficked bridges with "poor" ratings — bridges that could become dangerous or closed without repair. Table 2 lists the most heavily used structurally deficient bridges throughout West Virginia, ranked by average annual daily traffic (ADT) counts.

[4] 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
[5] T4 America's Analysis of FHWA's National Bridge Inventory Data. http://www.fhwa.dot.gov/bridge/britab.cfm.

Table 2: West Virginia's Structurally Deficient Bridges with Highest Traffic Volumes

Rank	County	Bridge Facility	Crosses Feature	Proximity to	Average annual daily traffic
1	Kanawha County	INTERSTATE 64	US60, WV25, KANAWHA RV.	0.85 MI E OF CR 25/25	78,000
2	Kanawha County	I-77 SBL.	CR 119/37 SURFACE DR	1.00 MI N OF I-79	31,750
3	Kanawha County	I-77	CR 119/37 SURFACE DR	1.00 MI N OF I-79	31,750
4	Berkeley County	I 81 X	US ROUTE 11	3.04 MI N OF WV 901 F	31,000
5	Berkeley County	I 81 X	US ROUTE 11	3.04 MI N OF WV 901 F	31,000
6	Ohio County	INTERSTATE 70 EB	BIG WHEELING CREEK	0.69 MI EAST US 40	29,750
7	Ohio County	I70 WESTBOUND	WHEELING CK MCCOLLOCH ST	0.35 MI EAST JCT US 40	29,750
8	Ohio County	INTERSTATE 70 EB	I70,WHEELING CK, CTY ST	0.35 MI EAST JCT US 40	29,750
9	Ohio County	I-70 EBL.	MT.DECHANTAL RD.	1.33 MI. E. JCT. US 40	27,000
10	Ohio County	I-70 WB.	MT DECHANTAL RD.	1.33 MI. E. JCT US. 40	27,000

West Virginia has 24 out of 55 counties where the average bridge condition is worse than the statewide average. Table 3 reveals the counties with the best and worst average bridge conditions. In Figure A, counties are shaded based on their overall percentage of "structurally deficient" bridges. Although smaller or more rural counties have fewer bridges than more populated counties, this measurement allows for cross-comparison between counties of various sizes.

Table 3: Counties in West Virginia With Best and Worst Average Bridge Conditions

County	# of Highway Bridges	# of Structurally Deficient Bridges	**% Structurally Deficient**
Pocahontas County	85	36	**42.4%**
Marshall County	68	26	**38.2%**
Webster County	62	2	**3.2%**
Braxton County	121	3	**2.5%**

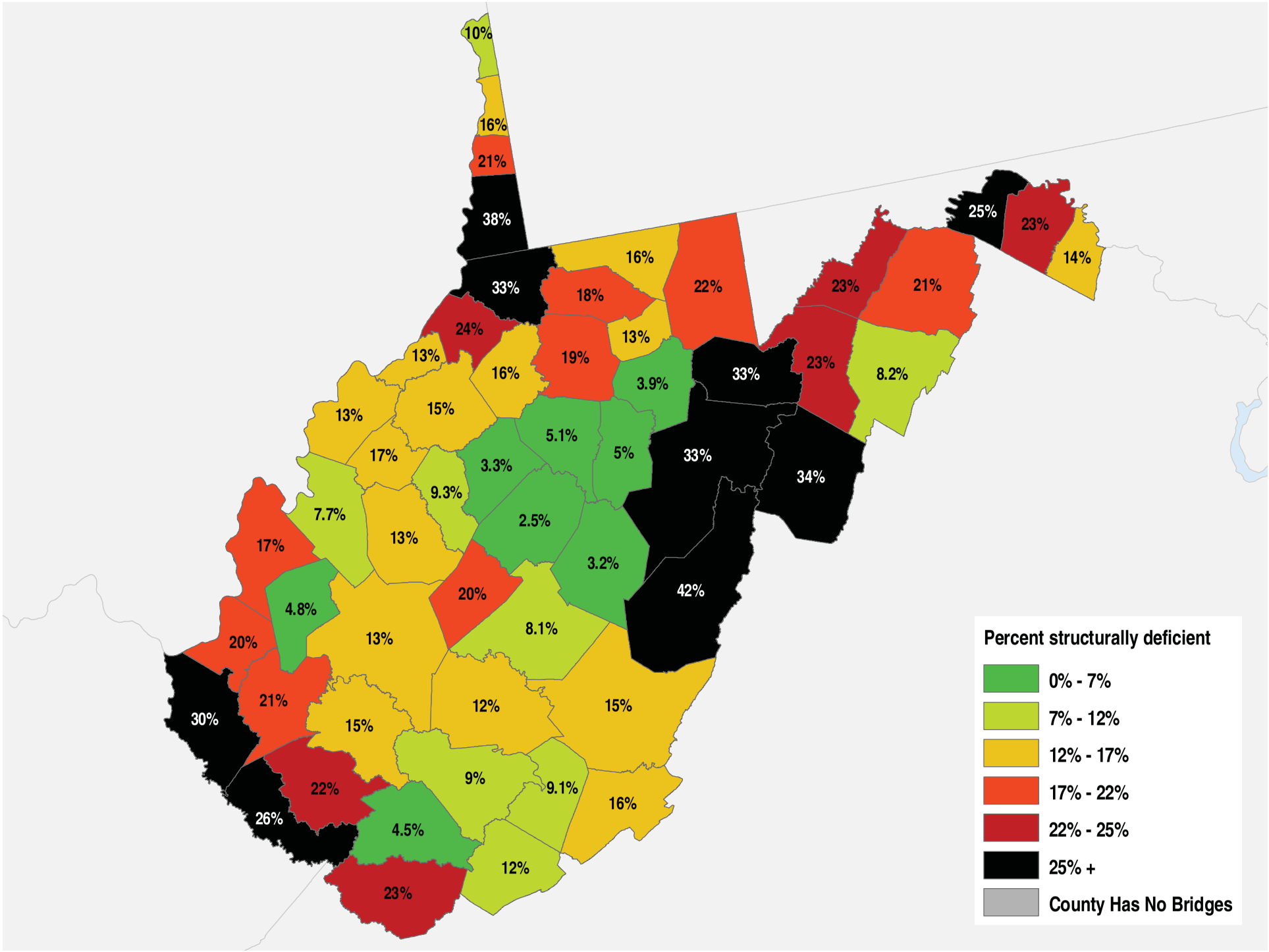
According to a 2007 survey by state transportation staff, West Virginia has upwards of 20 bridges under conditions similar to the collapsed I-35W bridge in Minnesota. Two of those bridges are rated "structurally deficient."

The Hartland Bridge, which is not rated structurally deficient and carries West Virginia 16 over Clay County's Elk River, was first built in 1924 and last renovated in 1976. It averages 2,300 vehicles every day. There is a 16-ton weight limit restriction on the bridge, but according to reports, truckers sometimes disobey that limit.

"The 571-foot span is showing its age," said local television reporter Bob Aaron in a recent story. "You can see right through it in places." A piece of metal patches over some the holes as a temporary stopgap. Although the bridge is scheduled for repair in 2012, finances in the state are tight and, for many residents, the bridge's rehabilitation cannot come soon enough.

"It scares me," said Junie Neal, a parent, told WBOY-TV. "I am looking for a phone call to say my kids went through the bridge on the bus. It just scares me until I see them get off the bus and go home."

Sources: http://www.wchstv.com/newsroom/eyewitness/101221_3786.shtml
http://wboy.com/story.cfm?func=viewstory&storyid=86183&printview=1
http://www.keepwvmoving.org/news/news/WVa-has-20-like-Minn-span-Two-classified-structurally-deficient-extra-inspections-to-start-next-week,188.aspx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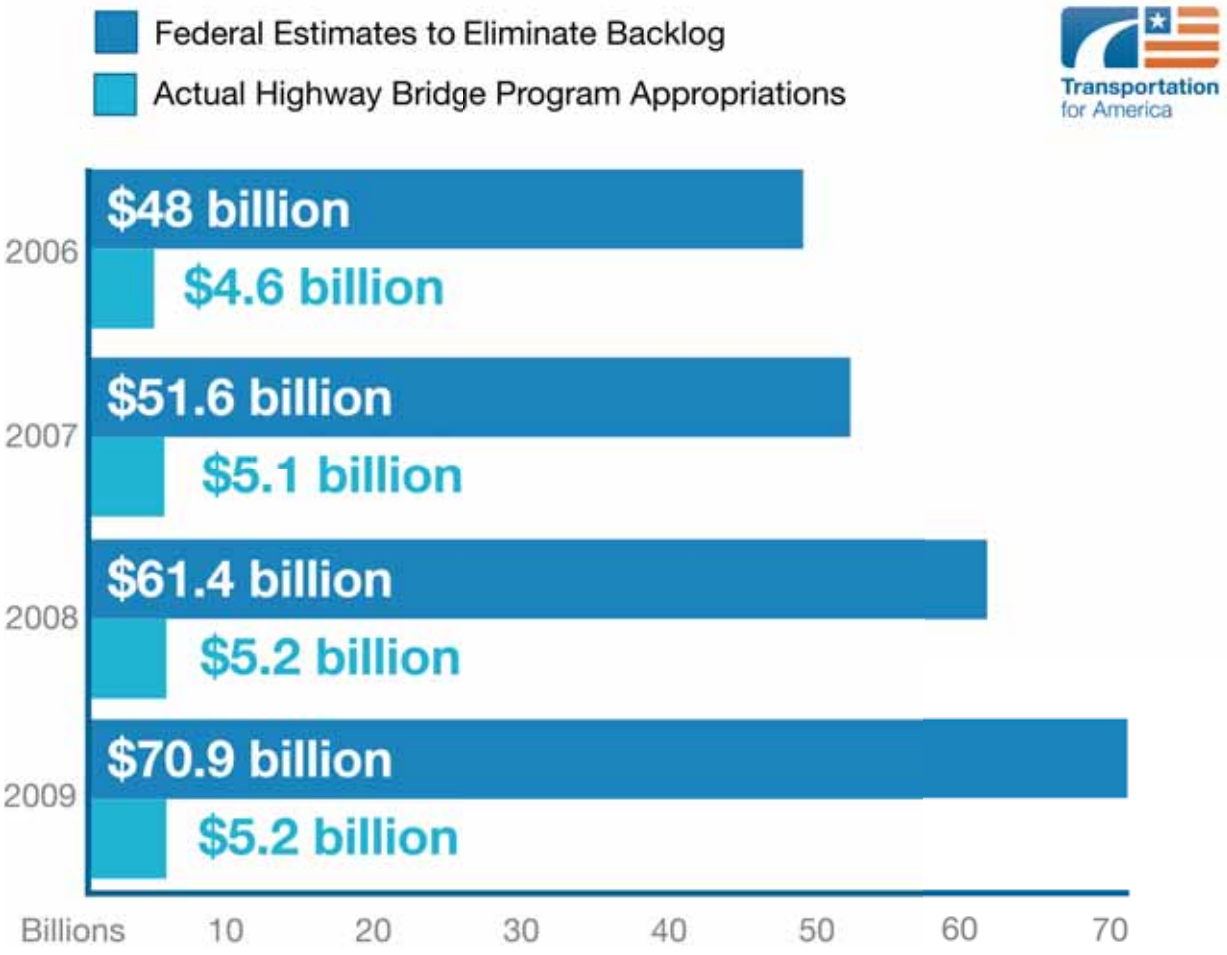
21%
33%
23%
8.2%
33%
34%
42%
Percent structurally deficient
0% - 7%
7% - 12%
12% - 17%
17% - 22%
22% - 25%
25% +
County Has No Bridges

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

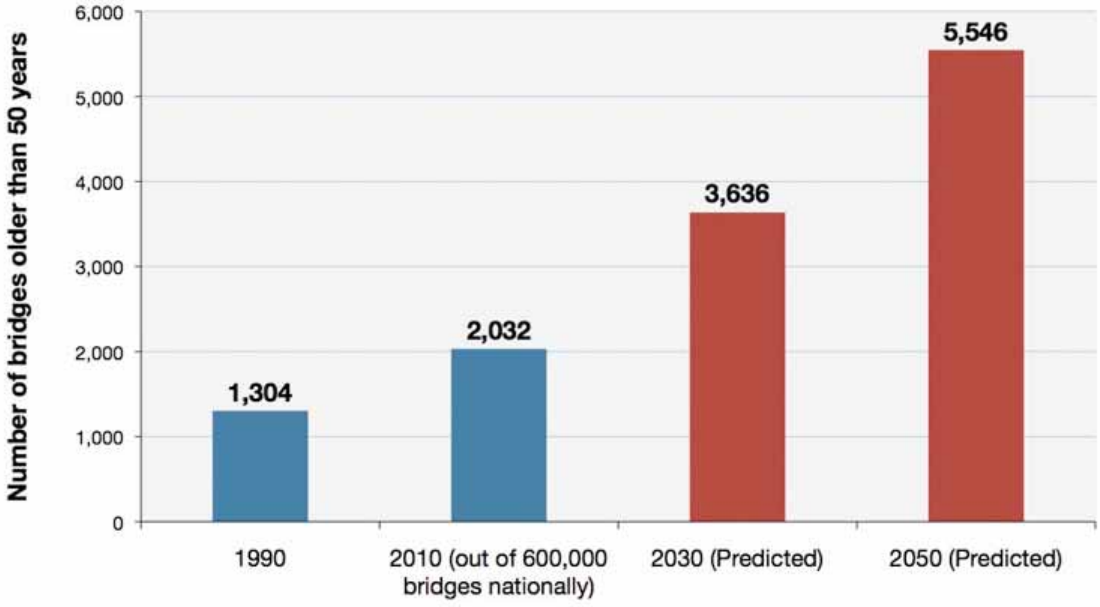
Figure B: Bridge Repair Funding Levels Versus FHWA Needs Estimate



The Cost of Aging Bridges

Regardless of the amount of wear and tear experienced by 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. West Virginia's average is 44.2 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. Nationally, more than 185,000 highway bridges (out of 600,000 total) are now 50 years old or older. By 2030, that number could double without substantial bridge replacement, and it has the potential to triple by 2050. With one in five bridges built over 50 years ago, almost half of all the nation's bridges may require major structural investments within the next 15 years.[6]

Figure C: West Virginia Bridges over 50 Years Old



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

Fixing Them First: Florida's Success Story

By prioritizing repair and maintenance of their existing bridges and setting repair performance standards, Florida's bridges are some of the safest and highest-rated 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 Florida Department of Transportation (FDOT), which is committed to protecting state investments. *Preservation is defined 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, maintenance, repair and replacement projects receive funds before all other projects. The state uses data and analytical tools to determine the amount of funding that will be necessary to meet the department repair standards.

In addition, Florida has a specific state initiative to replace and repair bridges. The State Maintenance Office 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 then also uses a computer program to prioritize and manage repair.

Florida's practices of prioritizing repair and maintenance, tracking repair needs, and setting measurable goals for success have helped the state have some of the best roads and bridges in the country.

The Tension Between Fixing the Old and Building the New

Under the existing federal program, transportation agencies have tended to delay needed repairs and preventive maintenance by directing funds toward new construction. In 2008, all states combined spent more than $18 billion, or 30 percent of federal transportation funds, 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. In 2008, West Virginia spent $148 million, or 20.2 percent of total federal funds, on bridge upkeep.[7] Though we need to continue expanding our transportation system, the safety and preservation of existing bridges and

[7] Ibid.

roads must be a higher priority for our long-term economic competitiveness and fiscal sustainability.

States Can't 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.[8] 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 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.[9] It is imperative that West Virginia maximize precious tax dollars by extending the useful service life of roads and bridges before major rehabilitation or replacement is required.

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

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

The Consequences of Deferred Maintenance

Neglecting bridge repair and maintenance won't just cost more money down the road — the consequences can be far more immediate and disastrous. Deferred maintenance can result in crippling delays if a vital artery is closed, or even worse, if lives are put in danger as aging bridges become unsafe and at risk for collapse.

Crown Point Bridge Closing

On October 16, 2009, the Champlain/Crown Point bridge linking New York and Vermont was closed without warning. An inspection performed on the bridge as part of a rehabilitation or replacement process, set to start in 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 have to drive about 100 miles out of their way to another bridge or pay at least $8 a trip for a ferry. A month later, officials in Vermont and New York announced that the bridge was beyond repair and would have to be demolished. Jim Bonnie, with the New York Department of Transportation, told NPR, "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."

Minneapolis' I-35W Collapse

On August 1, 2007, the I-35W bridge in Minneapolis, Minnesota abruptly failed, falling 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.

In addition to the safety imperative, investing in the construction, expansion and repair of our nation's transportation infrastructure creates jobs while laying the foundation for long-term economic prosperity. Repair work on roads and bridges generates 16 percent more jobs than new bridge and road construction.[10]

[10] Smart Growth for America. *The Best Stimulus for The Money. www.smartgrowthamerica.org/**stimulus**.html*

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

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 necessary funds 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. Though the size of the federal program has increased by 14 percent between 2006 and 2009, state-level needs increased by 47 percent.

Congress also needs to take steps to make sure that funds sent to states for bridge repair are used only for that purpose. Today states can transfer bridge funds for other purposes – even if they have bridges that are 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 focus on both keeping bridges in good condition and fixing or replacing bridges that are deficient. 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 across the country are already taking the right steps to repair their infrastructure. These best practices could serve as a model for other states and work with an improved federal program to fix our nation's bridges. Michigan, for example, has greatly increased the ratio of spending on routine maintenance and pavement preservation vis-à-vis capacity increases and/or 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.

When our aging bridges are replaced, they must be designed to provide safe access for all who need to use them, whether they are in vehicles, on foot or bicycle, or using public transit.

Conclusion

We cannot continue to ignore our transportation network's vital maintenance needs. The costs of current practices are well known, as roads and bridges continue to display the effects of wear and age, suffering the results of underinvestment. Without a change in both spending levels and overall priorities, West Virginia will need $578 from each driver to fix all of the structurally deficient bridges. As our bridges continue to age – more than 60 percent of all bridges will be past their useful life in 2030 – this figure will only grow.

Preserving West Virginia's existing transportation system is crucial to ensuring regional prosperity, safety and a higher quality of life. The economic and social cost of neglect is simply too high. It is time for our policymakers to shore up our infrastructure and ensure Americans get the most bang for our transportation buck.

Appendix A: West Virginia Counties, Ranked by Percentage of Structurally Deficient Bridges

County	Number of bridges	Number of structurally deficient bridges	**Percentage of bridges that are structurally deficient**	Bridge average annual daily traffic	Average annual daily traffic on SD bridges
Pocahontas County	85	36	**42.40%**	58,540	19,760
Marshall County	68	26	**38.20%**	220,545	115,150
Pendleton County	85	29	**34.10%**	59,450	34,000
Randolph County	156	52	**33.30%**	303,445	69,490
Wetzel County	87	29	**33.30%**	117,900	25,100
Tucker County	49	16	**32.70%**	42,390	11,360
Wayne County	135	40	**29.60%**	440,265	149,985
Mingo County	121	31	**25.60%**	295,070	40,865
Morgan County	40	10	**25.00%**	55,620	6,600
Tyler County	49	12	**24.50%**	32,825	5,415
Berkeley County	82	19	**23.20%**	915,445	137,530
Grant County	57	13	**22.80%**	83,590	19,580
McDowell County	154	35	**22.70%**	186,365	32,200

County	Number of bridges	Number of structurally deficient bridges	**Percentage of bridges that are structurally deficient**	Bridge average annual daily traffic	Average annual daily traffic on SD bridges
Mineral County	40	9	**22.50%**	89,190	21,230
Logan County	174	39	**22.40%**	430,630	92,040
Preston County	142	31	**21.80%**	181,165	16,790
Lincoln County	90	19	**21.10%**	118,705	10,740
Ohio County	91	19	**20.90%**	1,045,450	233,600
Hampshire County	58	12	**20.70%**	96,750	38,050
Cabell County	176	36	**20.50%**	1,698,015	289,655
Clay County	74	15	**20.30%**	61,650	6,000
Harrison County	223	42	**18.80%**	1,196,090	177,065
Marion County	161	29	**18.00%**	668,577	63,387
Mason County	99	17	**17.20%**	246,600	71,635
Wirt County	30	5	**16.70%**	16,335	6,230
Monroe County	44	7	**15.90%**	25,510	2,050
Monongalia County	164	26	**15.90%**	1,176,365	120,970
Brooke County	38	6	**15.80%**	182,710	23,860
Doddridge County	77	12	**15.60%**	88,535	14,880
Ritchie County	105	16	**15.20%**	101,628	9,890
Greenbrier County	166	25	**15.10%**	446,445	6,480
Boone County	109	16	**14.70%**	263,790	21,580
Jefferson County	29	4	**13.80%**	211,731	15,200
Taylor County	52	7	**13.50%**	57,895	4,510
Kanawha County	463	62	**13.40%**	5,631,403	342,490
Roane County	105	14	**13.30%**	178,455	14,620
Pleasants County	23	3	**13.00%**	64,235	155
Wood County	151	19	**12.60%**	913,485	125,160
Fayette County	162	20	**12.30%**	658,801	11,120

County	Number of bridges	Number of structurally deficient bridges	**Percentage of bridges that are structurally deficient**	Bridge average annual daily traffic	Average annual daily traffic on SD bridges
Mercer County	137	16	**11.70%**	616,540	24,710
Hancock County	20	2	**10.00%**	98,100	2,500
Calhoun County	43	4	**9.30%**	30,660	4,310
Summers County	55	5	**9.10%**	132,150	4,490
Raleigh County	166	15	**9.00%**	1,163,675	90,630
Hardy County	97	8	**8.20%**	151,632	20,650
Nicholas County	62	5	**8.10%**	147,460	4,080
Jackson County	156	12	**7.70%**	556,465	52,220
Lewis County	137	7	**5.10%**	456,935	7,730
Upshur County	80	4	**5.00%**	133,240	500
Putnam County	104	5	**4.80%**	842,310	16,750
Wyoming County	110	5	**4.50%**	180,990	5,710
Barbour County	77	3	**3.90%**	83,530	6,280
Gilmer County	90	3	**3.30%**	64,890	160
Webster County	62	2	**3.20%**	37,620	570
Braxton County	121	3	**2.50%**	394,535	1,110