

The State of Your Bridges

Our exclusive survey of bridge conditions in the United States

It's a case of good news/bad news. *Better Roads'* annual bridge inventory reveals that fewer of the country's bridges are considered structurally deficient (SD) or functionally obsolete (FO) than any time in the last five years. That's the good news. The bad news is that the number of bridges in those classifications is still worrying high.

The nation has 600,513 total bridges, but 23.3 percent – or 139,620 of them – are considered structurally deficient (SD) or functionally obsolete (FO). Of America's 291,034 total interstate and state bridges, 61,149 – or 21 percent – are SD/FO. There are 309,479 total city/county/township bridges in the United States, and 78,471 – or 25.4 percent – are SD/FO.

But there are 2,278 fewer bridges than last year rated as SD or FO. Last year, out of the 597,787 total bridges surveyed, 141,898 of them – or 23.7 percent – were SD/FO. Compared to last year, there are also fewer SD/FO interstate and state bridges. In 2009, 62,504 – or 21.6 percent of the total 288,920 interstate and state bridges – were SD/FO and 79,394 – 25.7 percent – of the 308,867 city/county/township bridges were found to be SD/FO last year. [Editor's Note: The 2009 numbers use 2008 data from Massachusetts and 2007 data from Rhode Island because updated numbers were not supplied for the 2009 Bridge Inventory.]

These are some of the findings from the *Better Bridges 2010 Annual Bridge Inventory*, an original research project conducted annually by *Better Roads*.

A Five-Year Look at America's Bridge Inventory

Type of Bridge	2006	2007	2008	2009	2010
Interstate and state bridges					
Total surveyed	285,942	287,431	288,511	288,920	291,034
*SD/FO	62,517	62,855	63,910	62,504	61,149
City, county, township bridges					
Total surveyed	309,247	310,384	308,893	308,867	309,479
*SD/FO	83,479	81,459	81,032	79,394	78,471
Total overall bridges surveyed					
Total	595,189	597,815	597,404	597,787	600,513
*SD/FO	145,996	144,314	144,942	141,898	139,620
2,726 more bridges in the national inventory in 2010 than 2009					

*SD/FO = structurally deficient, functionally obsolete

Source: *Better Roads* 2006-2010 Bridge Inventory Surveys

Where the most troubled bridges are

Although our nation's capital has only 199 bridges, **Washington, D.C.** has the worst percentage of SD/FO bridges in the nation by overall percentage. Of the District's 199 bridges, 123 – or 62 percent – are SD or FO, 7 percent more than in 2009.

The **District of Columbia's DOT (DDOT)**, however, says it expects to lower the rate of deficient bridges in the coming year through rehabilitation and reconstruction projects. But availability of funding remains the greatest challenge in reaching this goal, says Don Cooney, infrastructure project manage-

ment administrator for the DDOT, in his survey response to *Better Roads*.

Rhode Island is the second worse, with 417 – 53 percent – of 789 total bridges being SD or FO. The state has 54 percent – 341 – of its 634 total interstate and state bridges in FO or SD condition – and 49 percent – 76 of 155 – of total city/county/township bridges in SD or FO condition. "We have instituted a plan that targets structurally deficient bridges," David Fish with the **Rhode Island DOT** points out in his survey response.

The third ranking for combined overall FO/SD bridges is shared by **Hawaii** and **Pennsylvania** with a 38-percent

The *Better Roads Annual Bridge Inventory* was the 2008 and 2009 winner in the *Original Research* category in the American Society of Business Publication Editors' (ASBPE) National "Azbee Awards of Excellence" contest.



rate of overall combined SD/FO bridges. Pennsylvania has a higher rate of problem city/county/township bridges – 46 percent, or 3,143 of its total 6,815 municipal bridges – than Hawaii which also has 36 percent, with 147 of its 403 bridges in SD/FO condition. However, Hawaii has more SD and FO interstate bridges, 39 percent, than Pennsylvania, which has 34 percent or 5,708 of its 16,718 total interstate bridges in either SD or FO condition.

But **Pennsylvania DOT (PennDOT)** has an Accelerated Bridge Program (ABP) that is focused on reduction of structurally deficient bridges, explains James M. Long, P.E., assistant chief bridge engineer. What's more, "PennDOT has already implemented a design approach for 100-year bridge life to ensure durability," Long says.

It appears the ABP has made a difference. Last year, Pennsylvania had the most combined structurally deficient and functionally obsolete bridges by state. Of its 23,562 surveyed last year, it had a combined 9,130 – or 39 percent – that were SD/FO. That figure is down 1 percent this year. Although its percentage of SD/FO city/county/township bridges hasn't changed (46 percent), the state's percentage of SD/FO interstate bridges has decreased by 2 percent from last year's 36 percent.

The **Hawaii DOT** also expects to be able to lower its rate of deficient bridges in the coming year, but it will come "very slowly," says Paul Santo, bridge design engineer for the Hawaii Department of Transportation. "We have prioritized work on these bridges through our bridge management program," he says.

New York State records the fifth-highest percentage of combined SD/FO bridges with 37 percent of its total 17,405 bridges bearing an SD or FO rating. Breaking it down, 39 percent – 3,215 – of New York's 8,335 total interstate bridges are SD/FO, and 36 percent – 3,230 – of the state's 9,070 city/county/township bridges are SD/FO.

Next is a tie between **Connecticut** and **West Virginia** with 36 percent of their total bridges in SD/FO condition. West Virginia has more total bridges – 2,509 – in SD/FO condition than Connecticut, which has 1,508 rated as SD/FO. But 71 percent, or 78, of West Virginia's 110 total city/county/town-

ship bridge are SD/FO, while only 34 percent – 424 – of Connecticut's 1,240 total city/county/township bridges are SD/FO.

The states are close in SD/FO interstate bridges. Connecticut has 2,934 total interstate bridges with 1,084 or 37 percent SD/FO. West Virginia is 2 percentage points lower at 35 percent, with 2,431 of its 6,896 total interstate bridges classified as SD/FO.

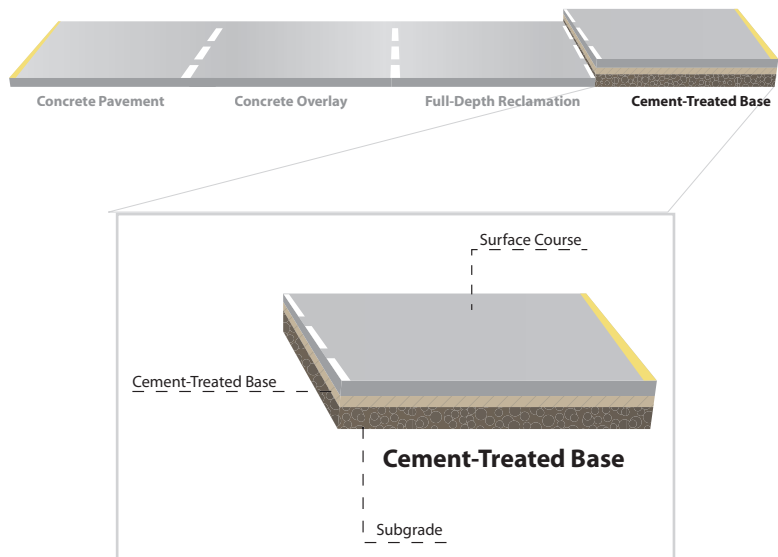
Environmental issues

Agencies report that environmental restrictions and regulations continue to pose problems for replacing and repairing structurally deficient or functionally obsolete bridges. This has been a chronic issue in *Better Roads* annual surveys.

The **District of Columbia** DOT says such restrictions do affect how well the agency is able to replace or



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If you could change any aspect of your department to improve your bridges, what would it be?

Anwar Ahmad, assistant bridge engineer with the Virginia Department of Transportation (VDOT): **"Direct more resources towards bridge preservation to perform cyclical preservation activities [on bridges] that are in fair to good conditions; improve design practices to construct maintenance-friendly bridges, i.e. eliminate expansion joints when possible; use corrosion-resistant steel reinforcement; place flexible wearing surface on newly constructed bridges with impervious membrane; and schedule the replacement of the overlay on a standard cycle, i.e. five, 10, or 15 years. Currently, VDOT is in the process of implementing most of these recommendations."**

Wayne J. Seger, civil engineering manager 2 with Tennessee Department of Transportation's bridge inspection and repair office: **"Do more annual bridge cleaning, especially of expansion joints and steel trusses. Remove animal deposits, i.e. nests, etc."**

Lee Floyd, bridge maintenance engineer with the South Carolina Department of Highways: **"[I'd change the] project selection process. [It's] too simplified and not responsive to highest needs."**

Roy Mumphrey, bridge engineer manager with the Louisiana Department of Transportation: **"Build more bridges with department personnel."**

David Sevens, assistant chief structures engineer with the Nevada Department of Transportation: **"Implement a bridge management system and more systematic bridge maintenance."**

Dan Holderman, bridge management engineer with the North Carolina Department of Transportation: **"Commit more funding to bridge rehabilitation and replacement."**

Alan Kowalik, bridge inspection engineer with the Texas State Department of Transportation: **"More bridge maintenance [to] maintain bridges to keep from becoming '50.'"**

Charles P. Brand, bridge engineer for the Arkansas State Highway Transportation Department: **"Implement bridge management for systematic maintenance of bridges to more effectively maintain our bridges with the money available."**

repair bridges, but concedes that "environmental restrictions are [just] a part of working in an urban environment."

The **Nevada DOT** says that environmental restrictions do have an impact on its ability to replace or repair bridges by resulting in a longer lead time for design, "but [they] are not insurmountable."

For the **North Carolina DOT**, environmental restrictions mean that "funds are diverted from projects to pay for permits [that are] required."

The **Maine DOT** also notes that environmental restrictions bring on "increased costs [that] reduce the number of bridges that can be fixed."

Kentucky is feeling similar financial pains because of environmental regulations. "Sometimes we are required to stay out of the water due to endangered species," David Steele, branch manager for the **Kentucky Transportation Cabinet**, notes in his survey response. "This increases the cost of the job. We then have less money for other bridge jobs."

In Pennsylvania, permit and regulatory agency requirements are a consideration for project delivery, but don't necessarily hinder how well the state can replace or repair its deficient bridges, says Long, PennDOT's assistant chief bridge engineer. "PennDOT funds certain positions within the regulatory agencies as provided under SAFETEA-LU in order to facilitate project delivery," Long says. "PennDOT also participates in monthly agency coordination meetings, which can also facilitate project delivery."

Although environmental restrictions do not affect how well **Tennessee** is able to replace or repair its deficient bridges, they do affect how "quickly and costly (sic) bridges get let to contract for replacement and/or repair," says Wayne J. Seger, civil engineering manager 2 with the **Tennessee DOT's** Bridge Inspection and Repair Office. Michael B. Johnson, the office chief for the **California DOT (Caltrans)**, agrees. He says that "permits slow the replacements and increase development costs."

Greg Roby, deputy director of structures for the **Maryland** State Highway Administration, notes in his survey response that the agency is "spending

increasing amounts of precious bridge funding to meet environmental (and other) requirements that have little or nothing to do with bridge preservation."

But not all agencies are being troubled by environmental factors. In fact, the **Florida DOT** says restrictions haven't had any impact on how well it is able to replace or repair a bridge.

The biggest problem across the country is lack of funds

Nearly all the state DOTs surveyed cited funding availability the greatest challenge in lowering their rate of deficient bridges. Heavy traffic, routing traffic during work on the structure and scour also came in at the top end of the list.

With the lack of a SAFETEA-LU reauthorization leaving the transportation construction industry in limbo for funding, many state agencies are apprehensive when it comes to planning for major projects. American Reinvestment and Recovery Act (ARRA)'s "Stimulus" funds have provided "a good momentum for addressing deficient bridge needs," says Anwar Ahmad, assistant bridge engineer with the **Virginia DOT (VDOT)**. "These funds were used to refund or rehabilitate 119 deficient structures," he says, adding that about 20 percent of the bridge work was from ARRA funds.

What's more, Ahmad notes, VDOT "fortunately has dedicated significant resources to [its] bridge program in the last few years" so insufficient funding shouldn't restrict important work in the coming year. "The current funding level should be adequate for the delivery of the program this coming year."

In **Texas**, which has the most bridges in the nation, 9,148 – or 18 percent – are structurally deficient or functionally obsolete. The **Texas State DOT (TxDOT)** says it should be able to lower this rate in the coming year. "Replacement priority is to replace '50' [year-old] bridges first," explains Alan Kowalik, TxDOT's bridge inspection engineer. The state also has an "equivalent match" program to assist cities and counties with replacing bridges, he says. The Stimulus has also kicked in about 18 percent of





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For the FHWA's explanation of what makes a bridge structurally deficient and how a bridge becomes functionally obsolete, go to <http://www.fhwa.dot.gov/policy/2008cpr/chap3.htm#7>.

Better Roads' editorial staff would like to thank all the state highway engineers for their continuing cooperation and special effort to provide current data. The data was collected through October 2010.

State	Total interstate & state bridges	Total *SD/FO	%	Total city/county/ township bridges	Total *SD/FO	%	Total all bridges	Combined total *SD/FO	%
Alabama	5,729	1,119	20%	10,114	2,393	24%	15,843	3,512	22%
Alaska	816	165	20%	147	55	37%	963	220	23%
Arizona	4,765	442	9%	2,675	318	12%	7,440	760	10%
Arkansas	7,205	1,116	15%	5,246	1,463	28%	12,451	2,579	21%
California	12,636	1,788	14%	12,397	2,612	21%	25,033	4,400	18%
Colorado	3,447	478	14%	4,701	620	13%	8,148	1,098	13%
Connecticut	2,934	1,084	37%	1,240	424	34%	4,174	1,508	36%
Delaware	847	171	20%	10	4	40%	857	175	20%
District of Columbia	199	123	62%	0	0	n/a	199	123	62%
Florida	6,221	815	13%	4,987	1,112	22%	11,208	1,927	17%
Georgia	6,583	939	14%	7,952	1,923	24%	14,535	2,862	20%
Hawaii	777	302	39%	403	147	36%	1,180	449	38%
Idaho	1,295	266	21%	2,347	410	17%	3,642	676	19%
Illinois	8,205	1,659	20%	18,122	2,669	15%	26,327	4,328	16%
Indiana	5,715	933	16%	12,920	3,058	24%	18,635	3,991	21%
Iowa	4,106	505	12%	20,475	6,156	30%	24,581	6,661	27%
Kansas	5,376	681	13%	20,111	4,203	21%	25,487	4,884	19%
Kentucky	8,933	2,576	29%	4,770	1,775	37%	13,703	4,351	32%
Louisiana	7,984	2,189	27%	5,182	1,615	31%	13,166	3,804	29%
Maine	2,078	554	27%	215	84	39%	2,293	638	28%
Maryland	2,899	624	22%	2,258	704	31%	5,157	1,328	26%
Massachusetts	3,557	1,250	35%	1,562	559	36%	5,119	1,809	35%
Michigan	4,406	979	22%	6,412	1,589	25%	10,818	2,568	24%
Minnesota	3,898	344	9%	9,813	1,432	15%	13,711	1,776	13%
Mississippi	5,675	1,091	19%	10,935	2,834	26%	16,610	3,925	24%
Missouri	10,335	2,679	26%	13,874	4,181	30%	24,209	6,860	28%
Montana	2,906	430	15%	1,978	449	23%	4,884	879	18%
Nebraska	3,515	248	7%	11,382	3,201	28%	14,897	3,449	23%
Nevada	1,095	157	14%	708	33	5%	1,803	190	11%
New Hampshire	1,501	323	22%	972	423	44%	2,473	746	30%
New Jersey	2,415	606	25%	4,078	1,149	28%	6,493	1,755	27%
New Mexico	2,973	374	13%	735	218	30%	3,708	592	16%
New York	8,335	3,215	39%	9,070	3,230	36%	17,405	6,445	37%
North Carolina	17,527	5,224	30%	791	188	24%	18,318	5,412	30%
North Dakota	1,128	67	6%	3,146	824	26%	4,274	891	21%
Ohio	11,664	2,513	22%	18,953	4,445	23%	30,617	6,958	23%
Oklahoma	7,670	1,621	21%	16,128	5,178	32%	23,798	6,799	29%
Oregon	2,692	719	27%	4,009	811	20%	6,701	1,530	23%
Pennsylvania	16,718	5,708	34%	6,815	3,143	46%	23,533	8,851	38%
Rhode Island	634	341	54%	155	76	49%	789	417	53%
South Carolina	8,357	1,736	21%	849	307	36%	9,206	2,043	22%
South Dakota	1,803	164	9%	3,987	1,230	31%	5,790	1,394	24%
Tennessee	8,172	1,202	15%	11,429	2,212	19%	19,601	3,414	17%
Texas	33,393	3,886	12%	17,626	5,262	30%	51,019	9,148	18%
Utah	1,857	248	13%	1,036	149	14%	2,893	397	14%
Vermont	1,078	299	28%	1,610	551	34%	2,688	850	32%
Virginia	11,803	3,126	26%	1,409	436	31%	13,212	3,562	27%
Washington	3,201	949	30%	3,949	896	23%	7,150	1,845	26%
West Virginia	6,896	2,431	35%	110	78	71%	7,006	2,509	36%
Wisconsin	5,136	584	11%	8,830	1,371	16%	13,966	1,955	14%
Wyoming	1,944	106	5%	856	271	32%	2,800	377	13%
TOTALS	291,034	61,149	21.0%	309,479	78,471	25.4%	600,513	139,620	23.3%



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Bridges
2010 BRIDGE INVENTORY

funding throughout the past two years to help with the state's bridge repair and replacement plans.

The **Nebraska Department of Roads** has also benefitted from ARRA, but the state has also established a dedicated fund to address high-priority bridges, which Steve Anderson, with the agency's Bridge Division, says should help lower the state's rate of deficient bridges. However, not surprisingly, Anderson says, "[we] always have more needs than funds."

In 2009, ARRA funded about 32 percent of Pennsylvania's bridge work. This year, the Stimulus only funded about 4 percent, according to PennDOT. In Nevada, the Stimulus has supplemented zero percent of the state's work this year, according to David Severns, assistant chief structures engineer with the **Nevada Department Transportation (NDOT)**. But this hasn't affected the state's ability to fund important work.

Severns says "continued use of federal Highway Bridge Program (HBP) funds" will allow the state to lower its rate of deficient bridges. In fact, the state has been working on one of the biggest bridge projects in the nation — the Hoover Dam Bypass project.

Tennessee, with 19,601 bridges — 3,414 of them, or 17 percent rated as SD/FO — was able to build or replace 81 bridges (48 local, 33 state bridges) with ARRA funds. The **Tennessee Department of Transportation (TennDOT)** says that insufficient funding is still the biggest challenge in lowering the state's rate of deficient bridges.

Seger, with TennDOT's Bridge Inspection and Repair Office, says his agency doesn't anticipate insufficient funds restricting important work in the coming year. In fact, TennDOT is currently in year two of a three-year program to retire about 200 structurally

Highest Percentage of SD/FO State/Interstate bridges

State	Total State and Interstate Bridges	Total State and Interstate SD/FO	%
District of Columbia	199	123	62%
Rhode Island	634	341	54%
Hawaii	777	302	39%
New York	8,335	3,215	39%
Connecticut	2,934	1,084	37%
Massachusetts	3,557	1,250	35%
West Virginia	6,896	2,431	35%
Pennsylvania	16,718	5,708	34%
North Carolina	17,527	5,224	30%
Washington	3,201	949	30%

*SD/FO = structurally deficient, functionally obsolete
Source: Better Roads 2010 Bridge Inventory Survey

deficient bridges. But he does point out that when states get federal money for bridges, they should "use it for bridges. Do not allow bridge funds to be diverted to other things."

Terry Udland, a bridge engineer with the **North Dakota Department of Transportation**, says that the



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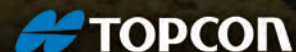
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How deficient and obsolete bridges break out in 2010

States and the District of Columbia have provided separate counts for the latest numbers on the breakdown of their structurally deficient (SD) and functionally obsolete (FO) bridges.

State	Interstate & State Bridges							City/County/Township Bridges						
	Total Bridges	Total FO	%	Total SD	%	Total *SD/FO	%	Total Bridges	Total FO	%	Total SD	%	Total *SD/FO	%
Alabama	5,729	959	17%	160	3%	1,119	20%	10,114	1,049	10%	1,344	13%	2,393	24%
Alaska	816	85	10%	80	10%	165	20%	147	21	14%	34	23%	55	37%
Arizona	4,765	356	7%	86	2%	442	9%	2,675	247	9%	71	3%	318	12%
Arkansas	7,205	812	11%	304	4%	1,116	15%	5,246	870	17%	593	11%	1,463	28%
California	12,636	1,156	9%	632	5%	1,788	14%	12,397	1,433	12%	1,179	10%	2,612	21%
Colorado	3,447	233	7%	245	7%	478	14%	4,701	318	7%	302	6%	620	13%
Connecticut	2,934	895	31%	189	6%	1,084	37%	1,240	224	18%	200	16%	424	34%
Delaware	847	123	15%	48	6%	171	20%	10	3	30%	1	10%	4	40%
District Of Columbia	199	101	51%	22	11%	123	62%	0	0	n/a	0	n/a	0	n/a
Florida	6,221	758	12%	57	1%	815	13%	4,987	918	18%	194	4%	1,112	22%
Georgia	6,583	784	12%	155	2%	939	14%	7,952	969	12%	954	12%	1,923	24%
Hawaii	777	260	33%	42	5%	302	39%	403	87	22%	60	15%	147	36%
Idaho	1,295	204	16%	62	5%	266	21%	2,347	145	6%	265	11%	410	17%
Illinois	8,205	1,005	12%	654	8%	1,659	20%	18,122	1,028	6%	1,641	9%	2,669	15%
Indiana	5,715	581	10%	352	6%	933	16%	12,920	1,442	11%	1,616	13%	3,058	24%
Iowa	4,106	318	8%	187	5%	505	12%	20,475	1,502	7%	4,654	23%	6,156	30%
Kansas	5,376	609	11%	72	1%	681	13%	20,111	1,470	7%	2,733	14%	4,203	21%
Kentucky	8,933	1,918	21%	658	7%	2,576	29%	4,770	1,158	24%	617	13%	1,775	37%
Louisiana	7,984	1,514	19%	675	8%	2,189	27%	5,182	580	11%	1,035	20%	1,615	31%
Maine	2,078	274	13%	280	13%	554	27%	215	11	5%	73	34%	84	39%
Maryland	2,899	504	17%	120	4%	624	22%	2,258	466	21%	238	11%	704	31%
Massachusetts	3,557	924	26%	326	9%	1,250	35%	1,562	365	23%	194	12%	559	36%
Michigan	4,406	632	14%	347	8%	979	22%	6,412	566	9%	1,023	16%	1,589	25%
Minnesota	3,898	227	6%	117	3%	344	9%	9,813	334	3%	1,098	11%	1,432	15%
Mississippi	5,675	830	15%	261	5%	1,091	19%	10,935	520	5%	2,314	21%	2,834	26%
Missouri	10,335	1,051	10%	1,628	16%	2,679	26%	13,874	1,740	13%	2,441	18%	4,181	30%
Montana	2,906	338	12%	92	3%	430	15%	1,978	321	16%	128	6%	449	23%
Nebraska	3,515	100	3%	148	4%	248	7%	11,382	934	8%	2,267	20%	3,201	28%
Nevada	1,095	140	13%	17	2%	157	14%	708	18	3%	15	2%	33	5%
New Hampshire	1,501	196	13%	127	8%	323	22%	972	182	19%	241	25%	423	44%
New Jersey	2,415	353	15%	253	10%	606	25%	4,078	777	19%	372	9%	1,149	28%
New Mexico	2,973	170	6%	204	7%	374	13%	735	130	18%	88	12%	218	30%
New York	8,335	2,524	30%	691	8%	3,215	39%	9,070	1,845	20%	1,385	15%	3,230	36%
North Carolina	17,527	2,671	15%	2,553	15%	5,224	30%	791	110	14%	78	10%	188	24%
North Dakota	1,128	36	3%	31	3%	67	6%	3,146	233	7%	591	19%	824	26%
Ohio	11,664	1,878	16%	635	5%	2,513	22%	18,953	2,111	11%	2,334	12%	4,445	23%
Oklahoma	7,670	819	11%	802	10%	1,621	21%	16,128	781	5%	4,397	27%	5,178	32%
Oregon	2,692	602	22%	117	4%	719	27%	4,009	524	13%	287	7%	811	20%
Pennsylvania*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rhode Island	634	176	28%	165	26%	341	54%	155	40	26%	36	23%	76	49%
South Carolina	8,357	754	9%	982	12%	1,736	21%	849	85	10%	222	26%	307	36%
South Dakota	1,803	91	5%	73	4%	164	9%	3,987	134	3%	1,096	27%	1,230	31%
Tennessee	8,172	911	11%	291	4%	1,202	15%	11,429	1,415	12%	797	7%	2,212	19%
Texas	33,393	3,557	11%	329	1%	3,886	12%	17,626	3,915	22%	1,347	8%	5,262	30%
Utah	1,857	216	12%	32	2%	248	13%	1,036	71	7%	78	8%	149	14%
Vermont	1,078	192	18%	107	10%	299	28%	1,610	336	21%	215	13%	551	34%
Virginia	11,803	2,003	17%	1,123	10%	3,126	26%	1,409	290	21%	146	10%	436	31%
Washington	3,201	799	25%	150	5%	949	30%	3,949	675	17%	221	6%	896	23%
West Virginia	6,896	1,456	21%	975	14%	2,431	35%	110	44	40%	34	31%	78	71%
Wisconsin	5,136	381	7%	203	4%	584	11%	8,830	374	4%	997	11%	1,371	16%
Wyoming	1,944	15	1%	91	5%	106	5%	856	110	13%	161	19%	271	32%
Totals	274,316	37,491	13.7%	17,950	6.5%	55,441	20.2%	302,664	32,921	10.9%	42,407	14.0%	75,328	24.9%

* Pennsylvania did not report SD/FO breakdowns



BETTER
Bridges
2010 BRIDGE INVENTORY

Combined Total All Bridges

Total Bridges	Total FO	%	Total SD	%	Total *SD/FO	%
15,843	2,008	13%	1,504	9%	3,512	22%
963	106	11%	114	12%	220	23%
7,440	603	8%	157	2%	760	10%
12,451	1,682	14%	897	7%	2,579	21%
25,033	2,589	10%	1,811	7%	4,400	18%
8,148	551	7%	547	7%	1,098	13%
4,174	1,119	27%	389	9%	1,508	36%
857	126	15%	49	6%	175	20%
199	101	51%	22	11%	123	62%
11,208	1,676	15%	251	2%	1,927	17%
14,535	1,753	12%	1,109	8%	2,862	20%
1,180	347	29%	102	9%	449	38%
3,642	349	10%	327	9%	676	19%
26,327	2,033	8%	2,295	9%	4,328	16%
18,635	2,023	11%	1,968	11%	3,991	21%
24,581	1,820	7%	4,841	20%	6,661	27%
25,487	2,079	8%	2,805	11%	4,884	19%
13,703	3,076	22%	1,275	9%	4,351	32%
13,166	2,094	16%	1,710	13%	3,804	29%
2,293	285	12%	353	15%	638	28%
5,157	970	19%	358	7%	1,328	26%
5,119	1,289	25%	520	10%	1,809	35%
10,818	1,198	11%	1,370	13%	2,568	24%
13,711	561	4%	1,215	9%	1,776	13%
16,610	1,350	8%	2,575	16%	3,925	24%
24,209	2,791	12%	4,069	17%	6,860	28%
4,884	659	13%	220	5%	879	18%
14,897	1,034	7%	2,415	16%	3,449	23%
1,803	158	9%	32	2%	190	11%
2,473	378	15%	368	15%	746	30%
6,493	1,130	17%	625	10%	1,755	27%
3,708	300	8%	292	8%	592	16%
17,405	4,369	25%	2,076	12%	6,445	37%
18,318	2,781	15%	2,631	14%	5,412	30%
4,274	269	6%	622	15%	891	21%
30,617	3,989	13%	2,969	10%	6,958	23%
23,798	1,600	7%	5,199	22%	6,799	29%
6,701	1,126	17%	404	6%	1,530	23%
n/a	n/a	n/a	n/a	n/a	n/a	n/a
789	216	27%	201	25%	417	53%
9,206	839	9%	1,204	13%	2,043	22%
5,790	225	4%	1,169	20%	1,394	24%
19,601	2,326	12%	1,088	6%	3,414	17%
51,019	7,472	15%	1,676	3%	9,148	18%
2,893	287	10%	110	4%	397	14%
2,688	528	20%	322	12%	850	32%
13,212	2,293	17%	1,269	10%	3,562	27%
7,150	1,474	21%	371	5%	1,845	26%
7,006	1,500	21%	1,009	14%	2,509	36%
13,966	755	5%	1,200	9%	1,955	14%
2,800	125	4%	252	9%	377	13%
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Q&A

If you could change any aspect of your department to improve your bridges, what would it be?

Jean A. Nehme, state bridge engineer for the Arizona Department of Transportation: **"Additional funding. Additional funding will allow [our agency] to repair/replace more bridges."**

Mark Leonard, staff bridge engineer with the Colorado Department of Transportation: **"It would be helpful to have more consistent and predictable long-term federal and state funding streams."**

Travis McDaniel, bridge engineer with the Wisconsin Department of Transportation: **"More preventive maintenance [so there is] less long-term deterioration."**

Ruby Bradley, Geometric & Accident Unit with the Kansas Department of Transportation: **"Reduce environmental constraints [because it causes] delays and extra work."**

Jeff C. Vigil, state bridge management engineer with the New Mexico Department of Transportation: **"Increase funding on secondary routes. Improve construction training."**

Oklahoma Department of Transportation (from media department): **"Add more bridges and bridge inspectors. Additional qualified personnel would help keep our inspections current and further improve the quality."**

Jim Pierce, bridge management engineer for Minnesota Bridges and Structures: **"Keep higher funding levels in place to maintain a sustainable network conditions level."**

Don Cooney, infrastructure project administrator with the Washington, D.C., Department of Transportation Asset Management Division: **"Increase funding for preventive maintenance."**

Benjamin W. Foster, assistant bridge maintenance engineer with the Maine Department of Transportation: **"Increased costs reduces [the] number of bridges that can be fixed."**

Charles P. Brand, bridge engineer with the Arkansas State Highway Transportation Department: **"Implement bridge management for systematic maintenance of bridges to more effectively maintain our bridges with the money available."**

David Steele, branch manager with the Kentucky Transportation Cabinet: **"Do more preventive maintenance and concentrate on making bridges more maintenance friendly. In the long run, it would cost less to maintain a bridge and they will last longer."**



BETTER BRIDGES 2010 BRIDGE INVENTORY

America's Bridges < continued

percentage of work that came from the Stimulus this past year was "minimal." **North Dakota** has a combined rate of 21 percent of bridges that are SD/FO (out of 4,274 total bridges, 891 are SD/FO), but Udland notes that the state expects to lower its rate of deficient bridges in the coming year by replacing or overlaying deficient decks and through overall bridge replacements.

Maryland bridge authorities report that the state received a "modest amount" of ARRA funding for bridges, which it in turn applied to replacing, repairing or painting about 35 bridges.

The Stimulus also modestly helped the **Oklahoma DOT (ODOT)**, which says that Stimulus money accounted for about 16 percent of its work. "It has had a very positive impact on bridge work in the state," said Oklahoma's survey respondent. The funds have allowed the re-decking of more than 40 bridges on I-244 in Tulsa, more commonly known as part of the Inner Dispersal Loop. "Due to many years of neglect, ODOT has fallen behind in the bridge programs," according to the state agency. "In recent years, Oklahoma has made tremendous progress in continued and consistent funding, which is critical to improve bridge conditions." An example of this progress is ODOT's eight-year construction work plan that has allocated \$361.3 million for bridge work in federal fiscal year 2011.

For the **Georgia DOT**, the Stimulus didn't supplement the agency at all because "[we] did not have plans on

the shelf," says Mike Clements, state bridge maintenance engineer with the Georgia DOT.

Eric J. Christie, assistant state maintenance engineer for bridges at the **Alabama DOT**, answered "no" when asked whether the state expects to be able to lower its rate of deficient bridges in the coming year.

Where now?

Better Roads asked that with all the funding uncertainty, what major overhauls can be made to the system of planning, building and maintaining bridges in the nation at the federal state and local level?

The answer is continued and consistent funding, with the flexibility to address the most critical needs, says the **Oklahoma DOT**. Paul Santo, bridge design engineer with the **Hawaii DOT**, says there needs to be "more funding at all levels."

Jeff C. Vigil, state bridge management engineer for the **New Mexico DOT**, says that "funding needs to be given to local bridges and lower-priority highway bridges on the state and federal system." In addition to funding, though, Vigil notes, "more preventative bridge maintenance funding would greatly keep bridge future funding needs down."

Louisiana DOT's Bridge Engineer Manager Ray Mumphrey also agrees that more money needs to be spent on maintenance. **TxDOT's** Kowalik says a dedicated bridge maintenance fund should be developed.

>>>

The top 10 states with the most city/county/township SD/FO bridges

State	City/County/ Township Bridges	City/County/ Township *SD/FO	%
Iowa	20,475	6,156	30%
Texas	17,626	5,262	30%
Oklahoma	16,128	5,178	32%
Ohio	18,953	4,445	23%
Kansas	20,111	4,203	21%
Missouri	13,874	4,181	30%
New York	9,070	3,230	36%
Nebraska	11,382	3,201	28%
Pennsylvania	6,815	3,143	46%
Indiana	12,920	3,058	24%

*SD/FO = structurally deficient, functionally obsolete

Source: Better Roads 2010 Bridge Inventory Survey



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Other major overhauls suggested are the expansion of eligible work under the Highway Bridge Program (HBP) and considering the bridge development timetable so it's reflected in future legislation. In overhauling the nation's bridge program at the federal, state and local level, "uniformity in rules and a more streamlined process for the bridge program" should also be considered, says Cody Axlund, bridge inventory/inspection engineer for the **South Dakota DOT**.

Where and how could the nation even begin to implement these ideas and overhaul the planning, building and maintenance system for bridges, asked the survey?

Ahmad, with the **Virginia Department of Transportation (VDOT)**, recommends developing a strategic approach at the federal, state and local levels "to deliver the most reliable bridge inventory in the world."

The strategic approach can be accomplished, Anwar says, by dedicating adequate and sustained funding and resources to three distinct programs. He suggests a preventive/preservation program, a rehabilitation program, and a replacement program.

"The three programs should be based on life cycle and assets management principles," Anwar advises. "Develop policies and processes around these programs that ensure consistency in measuring the effectiveness of these programs." ❖

The top 10 states with total number of State/Interstate SD/FO* bridges

State	Total Interstate Bridges	Interstate State/Total SD/FO	%
Pennsylvania	16,718	5,708	34%
North Carolina	17,527	5,224	30%
Texas	33,393	3,886	12%
New York	8,335	3,215	39%
Virginia	11,803	3,126	26%
Missouri	10,335	2,679	26%
Kentucky	8,933	2,576	29%
Ohio	11,664	2,513	22%
West Virginia	6,896	2,431	35%
Louisiana	7,984	2,189	27%

*SD/FO = structurally deficient, functionally obsolete
Source: Better Roads 2010 Bridge Inventory Survey

States with the highest percentage of city/county/township SD/FO* bridges

State	City/County/Township Bridges	City/County/Township *SD/FO	City/County/Township %
West Virginia	110	78	71%
Rhode Island	155	76	49%
Pennsylvania	6,815	3,143	46%
New Hampshire	972	423	44%
Delaware	10	4	40%
Maine	215	84	39%
Alaska	147	55	37%
Kentucky	4,770	1,775	37%
Hawaii	403	147	36%
Massachusetts	1,562	559	36%
New York	9,070	3,230	36%
South Carolina	849	307	36%
Connecticut	1,240	424	34%
Vermont	1,610	551	34%
Oklahoma	16,128	5,178	32%
Wyoming	856	271	32%
Louisiana	5,182	1,615	31%
Maryland	2,258	704	31%
South Dakota	3,987	1,230	31%
Virginia	1,409	436	31%
Iowa	20,475	6,156	30%
Missouri	13,874	4,181	30%
New Mexico	735	218	30%
Texas	17,626	5,262	30%

*SD/FO = structurally deficient, functionally obsolete
Source: Better Roads 2010 Bridge Inventory Survey

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