Showing Their Age:
Pennsylvania's Deficient Bridges

Strategies to improve the condition of Pennsylvania's bridges and keep them in good shape

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Executive Summary

Pennsylvania's 22,174 bridges are a vital link in the state's transportation system, connecting communities and regions of the state. The continued high level of deterioration on Pennsylvania's bridges is a visible sign of the state's aging and over-burdened bridge network.

In this report, The Road Information Program (TRIP) examines the condition of Pennsylvania's bridges, based on data updated regularly by the Federal Highway Administration (FHWA).

Ratings for bridges and data on individual bridges have been taken from the FHWA's National Bridge Inventory, which maintains condition data for all bridges longer than 20 feet. The major findings of the report are:

Pennsylvania has the third-highest percentage of structurally deficient bridges in the country, behind only Oklahoma and Rhode Island. One in four bridges in the state are in need of immediate repair or replacement because of deterioration. 18 percent of Pennsylvania's bridges are functionally obsolete because they no longer meet current design and safety standards.

- 25 percent of the state's bridges are structurally deficient, showing significant deterioration to decks and other major components. The classification of a bridge as "structurally deficient" does not mean the structure is unsafe. Pennsylvania's bridge safety inspection program, which inspects each bridge on a 24-month cycle, ensures that each bridge is safe for vehicles weighing less than the posted weight limit. If the inspection determines a bridge to be unsafe for cars, the bridge is closed until repaired or replaced.

- 18 percent of the state's bridges are rated as functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.

- Locally maintained bridges – those maintained by city or county agencies- have a slightly higher deficiency rating than state maintained bridges. 27 percent of locally maintained bridges are structurally deficient, and 18 percent are functionally obsolete. 24 percent of state maintained bridges are structurally deficient, and 17 percent are functionally obsolete.

Pennsylvania's bridges are aging, and many have outdated designs and inadequate safety features. Pennsylvania faces a significant cost to improve these bridges. The cost of repairing all bridge deficiencies in Pennsylvania is approximately $7 billion.

- The average age of Pennsylvania's bridges is 48 years. Most bridges have a design life of 40 to 50 years.
- 45 percent of Pennsylvania's bridges are more than 50 years old, and 17 percent are more than 75 years old.
- According to the Federal Highway Administration (FHWA), the cost to repair all structurally deficient Pennsylvania bridges is $4.9 billion. Repairing functionally obsolete bridges would cost an additional $2.1 billion.
- Overall bridge conditions in the state have remained stable for the last five years.

TRIP has compiled a list of the 652 structurally deficient bridges in Pennsylvania that carry at least 10,000 vehicles per day. A full list of Pennsylvania's structurally deficient high volume bridges can be found in Appendix A. County specific bridge data is available in Appendix B.

- Clearfield County has the highest percentage of structurally deficient bridges in the state, with 45 percent of its bridges in need of immediate repair or replacement. It is followed, respectively, by McKean, Lawrence, Cameron, Potter, Butler, Wyoming, Beaver, Armstrong, and Elk counties. Appendix B lists bridge conditions in each Pennsylvania county.
- The following is a list of overall bridge conditions in Pennsylvania's key metro areas, detailing structurally deficient (SD) bridges as well as functionally obsolete (FO) bridges:

URBAN AREA	TOTAL BRIDGES	# SD	% SD	# FO	% FO	TOTAL DEFICIENT	PERCENT DEFICIENT
ALLENTOWN/BETHLEHEM	668	103	15%	211	32%	314	47%
ERIE	420	81	19%	70	17%	151	36%
HARRISBURG	765	103	13%	192	25%	295	39%
PHILADELPHIA	2,307	518	22%	568	25%	1,086	47%
PITTSBURGH	1,210	354	29%	352	29%	706	58%
SCRANTON/WILKES-BARRE	779	183	23%	111	14%	294	38%

- For a list of the most deficient, heavily traveled bridges in each urban area, see text of this report.

- Overall, 23 percent of urban bridges in the state are structurally deficient, and another 24 percent are functionally obsolete. Pennsylvania's urban bridges typically carry a high volume of traffic, often more than they were designed to handle.

- 26 percent of Pennsylvania's rural bridges are structurally deficient, and 15 percent are functionally obsolete. Deficient rural bridges can have an adverse effect on agriculture, as machines and heavy equipment may be diverted to less-direct routes. Fire trucks, ambulances and other emergency services also may be delayed as a result of deficient rural bridges.

Pennsylvania's economic livelihood relies on a safe and efficient system of roads and bridges. Deficient bridges can harm a region's economic development by reducing access, particularly for large commercial vehicles, which are critical to business productivity. Bridge conditions in Pennsylvania are impacted by rising levels of highway travel, especially commercial trucking, which accounts for an increasing amount of overall vehicle travel.

- Vehicle travel in Pennsylvania increased by 18 percent between 1991 and 2001. Vehicle travel is expected to increase 30 percent by the year 2020.

- Large truck travel accounted for 11 percent of total vehicle travel in Pennsylvania in 2001.

- Travel by large trucks in Pennsylvania is expected to increase 33 percent by 2020.

- 88 percent of the $297 billion worth of commodities delivered annually from sites in Pennsylvania are transported on the state's bridges and highways.

Keeping bridges in good condition requires adequate funding, the use of improved bridge maintenance practices and the use of improved construction materials. TRIP recommends the following strategies:

- Increase bridge investment statewide to allow for an expanded program of bridge repairs.

- Expand the current bridge maintenance program to slow the rate of bridge deterioration by reducing the amount of damage occurring from precipitation and traffic wear.

- Consider the use of high-performance materials, such as improved steel, concrete and fiber products, which may result in lower lifecycle costs by building or re-constructing bridges that can last longer and carry larger traffic volumes.

Introduction

Pennsylvania's 22,174 bridges are critical to its transportation system, allowing people and goods to move around the state in a safe and efficient manner. Bridges provide communities and individuals with access to employment, schools, shopping and medical facilities, as well as facilitating commerce and access for emergency vehicles.

The average age of Pennsylvania's bridges is 48 years. Forty-five percent of Pennsylvania's bridges are more than 50 years old and 17 percent are more than 75 years old. Typically, bridges have a design life of 40 to 50 years. Pennsylvania's aging bridges are showing signs of fatigue and are often operating under more stress than they were designed to handle.

Faced with budget cutbacks, many states are struggling to maintain an acceptable schedule of maintenance, repair, and replacement on their roads and bridges. The problem of funding high cost bridge repairs in Pennsylvania is exacerbated by the tremendous increases in traffic volumes occurring, particularly of large commercial trucks.

This report by The Road Information Program (TRIP) looks at conditions on Pennsylvania's bridges, lists the structurally deficient, heavily traveled bridges in each Pennsylvania county and select urban areas, examines overall bridge conditions at the state and local level and establishes a set of strategies that can significantly improve bridge conditions statewide.

Data for this report have been obtained from the National Bridge Inventory (NBI), an inventory of the condition of all bridges that are at least 20 feet in length. The inventory is maintained by the Federal Highway Administration (FHWA). The Pennsylvania Department of Transportation regularly inspects each bridge in the state, whether the bridge is actually the responsibility of the state or local government, and submits bridge condition data to the Federal Highway Administration. Other sources of information include the Pennsylvania Department of Transportation and the U.S. Department of Transportation.

The Condition of Pennsylvania's Bridges

Pennsylvania has the third-highest percentage of structurally deficient bridges in the country. State, county and municipal governments in Pennsylvania are responsible for maintaining, repairing or replacing these bridges.

According to the Federal Highway Administration's National Bridge Inventory, 25 percent of Pennsylvania's bridges are structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient are often posted to carry only lower weight vehicles or are closed if they are found to be unsafe. The classification of a bridge as "structurally deficient" does not mean the structure is unsafe. Pennsylvania's bridge safety inspection program, which inspects each bridge on a 24 month cycle, ensures that each bridge is safe for vehicles weighing less than the posted weight limit. If the

inspection determines a bridge to be unsafe for cars, the bridge is closed until repaired or replaced.

Another 18 percent of Pennsylvania's bridges are functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate underclearances or poor alignment, all of which reduce highway safety.

Locally maintained bridges – those maintained by city or county agencies- have a slightly higher deficiency rating than state maintained bridges. 27 percent of locally maintained bridges are structurally deficient, and 18 percent are functionally obsolete. 24 percent of state maintained bridges are structurally deficient, and 17 percent are functionally obsolete.

Oklahoma leads the country in the percentage of its bridges rated structurally deficient. It is followed by, respectively, Rhode Island, Pennsylvania, Missouri and Mississippi. Nationally, 14 percent of bridges are structurally deficient.

Table 1. Top five states with highest percentage of bridges rated structurally deficient, 2002.

Oklahoma	33%
Rhode Island	25%
Pennsylvania	25%
Missouri	23%
Mississippi	22%

Source: TRIP analysis of FHWA data

Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate underclearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Bridge conditions in Pennsylvania have remained relatively stable in the last five years. Structurally deficient bridges have been in the 24-25 percent range, and functionally obsolete bridges have been at 18-19 percent.

Table 2. Deficient bridges 1998-2002.

YEAR	TOTAL BRIDGES	STRUCTURALLY DEFICIENT	FUNCTIONALLY OBSOLETE
1998	21,982	25%	18%
1999	22,048	25%	17%
2000	22,074	24%	18%
2001	22,114	24%	18%
2002	22,174	25%	18%

Source: National Bridge Inventory (FHWA)

Urban Bridges

Pennsylvania's urban bridges carry a high volume of traffic, often more than they were designed to handle. Increased travel, especially by large trucks, can have a significant impact on urban bridge conditions. According to the National Bridge Inventory, a total of 23 percent of urban bridges in Pennsylvania are structurally deficient, and another 24 percent are functionally obsolete. Based on data from the National Bridge Inventory, TRIP has assembled a list of the bridge conditions in Pennsylvania's key urban areas: Allentown/Bethlehem, Erie, Harrisburg, Philadelphia, Pittsburgh and Scranton/Wilkes-Barre. Because bridge conditions are recorded on a county-wide basis, data for urban areas is based on entire counties included within that urban area. The following is a list of counties included by TRIP in describing and listing bridge conditions in these urban areas:

Table 3. Counties Included in Urban Areas.

URBAN AREA	COUNTY
ALLENTOWN/BETHLEHEM	LEHIGH
	NORTHAMPTON
ERIE	ERIE
HARRISBURG	DAUPHIN
	CUMBERLAND
PHILADELPHIA	BUCKS
	DELAWARE
	MONTGOMERY
	PHILADELPHIA
PITTSBURGH	ALLEGHENY
SCRANTON/WILKES-BARRE	LACKAWANNA
	LUZERNE

TRIP has prepared the following is a listing of bridge conditions in Pennsylvania's key urban areas, according to National Bridge Inventory data.

Table 4. Bridge Conditions by Urban Area.

URBAN AREA	TOTAL BRIDGES	# SD	% SD	# FO	% FO	TOTAL DEFICIENT	PERCENT DEFICIENT
ALLENTOWN/BETHLEHEM	668	103	15%	211	32%	314	47%
ERIE	420	81	19%	70	17%	151	36%
HARRISBURG	765	103	13%	192	25%	295	39%
PHILADELPHIA	2,307	518	22%	568	25%	1,086	47%
PITTSBURGH	1,210	354	29%	352	29%	706	58%
SCRANTON/WILKES-BARRE	779	183	23%	111	14%	294	38%

Source: TRIP analysis of National Bridge Inventory, 2002.

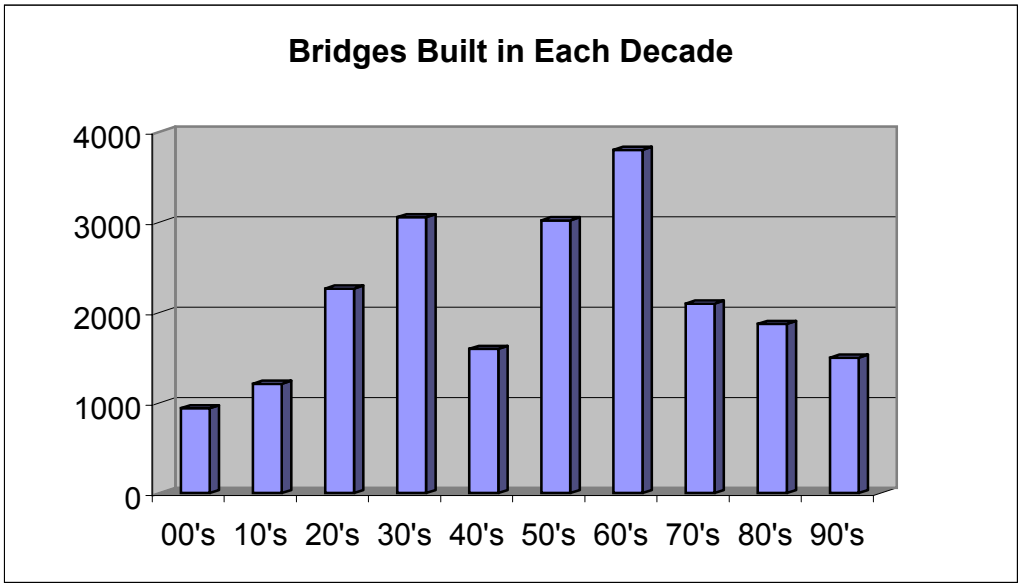
Rural Bridges

Twenty-six percent of Pennsylvania's rural bridges are structurally deficient – higher than the rate of structural deficiency in urban areas. In addition, 15 percent of rural bridges are functionally obsolete. Deficient rural bridges that are closed or posted for only lower-weight vehicles can potentially cause significant delays for emergency vehicles such as fire trucks and ambulances, at a time when a rapid response is crucial. Deficient rural bridges can also have an adverse effect on agriculture, as machines and heavy equipment may be diverted to less-direct routes. School buses and other heavy vehicles may also be prohibited from using deficient rural bridges, forcing them to waste time and fuel seeking an alternate route.

The Lifespan of Bridges

The average age of Pennsylvania's bridges is 48 years, with Pennsylvania bridge construction peaking in the 1950's and 1960's. More than 45 percent of Pennsylvania's bridges 20 feet or longer – 9,927 bridges - are more than 50 years old, and 17 percent are more than 75 years old. Most bridges are designed to last approximately 40 to 50 years. The following chart details the number of bridges built in Pennsylvania during each decade over the last 100 years.

Chart 5. The Age of Pennsylvania's Bridges



Source: TRIP analysis of FHWA data

Deficient High-Volume Bridges

Bridges that carry a significant level of traffic are of particular concern to the state and local governments responsible for maintaining them. Bridges carrying high volumes of traffic have significant stress generated by the heavy traffic of cars and trucks crossing

them every day. These bridges are also quite often larger, more heavily traveled and thus more costly to repair. And finally these bridges are typically crucial to a region's transportation system, thus any traffic disruptions caused by construction need to be minimized, making it more difficult to repair these bridges.

Using data in the NBI inventory, TRIP identified all structurally deficient bridges in Pennsylvania that carry at least 10,000 vehicles a day. Data such as the year the bridge was built, length and daily traffic counts were gathered.

The 652 structurally deficient, heavily-traveled bridges in Pennsylvania are listed in Appendix A. Structurally deficient bridges may be ranked by a composite score determined for each bridge by the FHWA based on the condition of the bridge, the level of use, the adequacy of the bridge's design and how critical the bridge is to the local transportation network. TRIP has ranked the bridges based on their overall sufficiency score, with the bridge with the lowest score being ranked first.

Deficient Bridges by Region

TRIP has compiled a list of the most deficient bridges (up to 40), ranked in order of greatest deficiency, in key urban areas. A full listing of all deficient high volume bridges in the state can be found in Appendix A.

ALLENTOWN/BETHLEHEM:

	ROUTE	FEATURES INTERSECTED	LOCATION	COUNTY	YEAR BUILT	ADT
1	SR 2045	TRIB. SAUCON CREEK	CENTER VALLEY	Lehigh	1915	11,220
2	SR 873	TROUT CREEK	GEN.THOS.R.MORGAN BRIDGE	Lehigh	1901	12,154
3	SR 1002	T-574(CHAPMANS RD.)	TILGHMAN OVER CHAPMANS RD	Lehigh	1940	18,892
4	LEHIGH ST	CONRAIL(ABANDONED)	LEHIGH RIV.BRIDG	Lehigh	1933	10,201
5	PA TURNPIKE	APPL745,TROUT RUN;NB-391	EMERALD,W OF SLATINGTON	Lehigh	1956	27,068
6	RPS TO SERVICE PL	PA TPK(I-476);NB-345A	NEAR ALLENTOWN	Lehigh	1956	21,763
7	SR 1014	COPLAY CREEK	LEHIGH ST.@ SIXTH ST.	Lehigh	1932	10,201
8	SR 29	READING RR	0.2 MI.S.OF TURNPIKE	Lehigh	1927	19,540
9	SR1011	NORFOLK SOUTHERN RR	AT RT.378 INTERCHANGE	Lehigh	1967	23,882
10	SR 512	TRIB.TO BUSHKILL CREEK	65'S.OF WIND GAP LINE	Northampton	1949	19,045
11	SR 512	TRIB. MONOCACY CREEK	BETH-BATH PIKE	Northampton	1923	12,942
12	SR 1017	COPLAY CREEK	MAUCH CHUNK RD	Lehigh	1910	10,539
13	SR145	COPLAY CREEK	1 MI.S.OF PA329	Lehigh	1941	21,908
14	PA 29/100	INDIAN CREEK	0.4 MI.S.OF SR 2025	Lehigh	1926	11,665
15	SR 412	SAUCON CREEK	HELLERTOWN ROAD	Northampton	1928	20,252
16	SR 1015	SR 22 (LR 771)	US22 FULLERTON INTERCHG	Lehigh	1953	13,668
17	15TH STREET	M.L.KING JR. DRIVE	N OF LITTLE LEHIGH CREEK	Lehigh	1955	20,000
18	SR 248	TRIB.BUSHKILL CK.	25TH & NORTHAMPTON STS.	Northampton	1954	29,967
19	15TH STREET	LITTLE LEHIGH & CONRAIL	s. OF HAMILTON STREET	Lehigh	1956	20,000

ERIE:

	ROUTE	FEATURES INTERSECTED	LOCATION	COUNTY	YEAR BUILT	ADT
1	SR 6,S. MAIN ST.	OVER FRENCH CREEK S BR	UNION CITY BOROUGH	Erie	1924	11,185
2	SR 20,RIDGE RD	OVER WALNUT CREEK	FAIRVIEW TOWNSHIP	Erie	1939	13,578
3	WEST 38TH STREET	OVER MILL CREEK	0.3 MI.E.OF PEACH STREET	Erie	1934	20,600
4	SR 90,EB	OVER SIX MILE CREEK	HARBOR CREEK TOWNSHIP	Erie	1959	16,789
5	SR 19,N&S PEACH ST	OVER WALNUT CREEK	MILL CREEK TOWNSHIP	Erie	1950	28,294
6	SR 4014,W GRNDVIEW	OVER SR 79,NB/SB	CITY OF ERIE	Erie	1965	12,379
7	SR 90,EB	OVER T-384 COLESPRNGS,RR	GIRARD TOWNSHIP	Erie	1959	10,157
8	SR 90,WB	OVER T-475,NEIGER ROAD	GIRARD TOWNSHIP	Erie	1959	10,295
9	SR 90,EB	OVER SR 531,DOPOT RD	HARBOR CREEK TOWNSHIP	Erie	1959	13,057
10	SR 505,GLENWOOD AV	OVER MILL CREEK	CITY OF ERIE	Erie	1954	10,332
11	SR 89,SOUTH LAKE	OVER SIXTEEN MILE CK BR	NORTH EAST BOROUGH	Erie	1915	10,406

HARRISBURG:

	ROUTE	FEATURES INTERSECTED	LOCATION	COUNTY	YEAR BUILT	ADT
1	MACLAY ST. /TURNBK	RAILROAD	MACLAY ST IN HARRISBURG	Dauphin	1940	24,150
2	SR 3009	NORFOLK SOUTHERN	2ND AND PAXTON STS HBG	Dauphin	1929	24,132
3	SR 3009	FISHING CREEK	1 MI. S. OF DAUPHIN	Dauphin	uknwn	12,492
4	US 11; SR 0011	CONRAIL	WEST FAIRVIEW	Cumberland	1939	24,688
5	US 15; SR 0015	T-618; ZIMMERMAN DRIVE	CAPITAL CITY MALL	Cumberland	1970	48,332
6	I-81; SR 0081	CONRAIL;LETORT SPRING RU	.2 MI. N. OF PA 34	Cumberland	1962	20,400
7	SR 3017	I-81; SR 0081	1.5 NORTH OF PROGRESS	Dauphin	1968	14,305
8	PA TURNPIKE (I-76)	T-508; B-575	MIDDLESEX TWP	Cumberland	1939	20,751
9	PA TURNPIKE (I-76)	T-448; B-102A	NORTH MIDDLETON TWP	Cumberland	1939	20,751
10	I-81; SR 0081	SR 3009;SUS.RIV;CONRAIL	HARRISBURG (WADE BR)	Dauphin	1973	64,733
11	US 15; SR 0015	CONRAIL	NEAR CAMP HILL	Cumberland	1955	48,332
12	PA 230; SR 0230	ASYLUM RUN	HARRISBURG	Dauphin	uknwn	30,677
13	PA 283; SR 0300	I-283; SR 0283	1 MI N HIGHSPIRE	Dauphin	1969	47,300
14	PA 74; SR 0074	LETORT SPRING RUN	CARLISLE BORO	Cumberland	1936	13,004
15	US 15; SR 0015	SIMPSON FERRY RD.SR 2014	NEAR CAMP HILL	Cumberland	1955	48,332
16	US 11/15; SR 0011	US 11; PA 581; SR 0581	CAMP HILL BORO	Cumberland	1955	44,770
17	PA 39; SR 0039	RAILROAD	0.5 MI S OF ROCKVILLE	Dauphin	1971	18,105
18	US 11; SR 0011	HOGESTOWN RUN	HOGESTOWN	Cumberland	1941	11,391
19	I-81 SB; SR 0081	CONODOGUINET CREEK	1.5 MI.E. OF LR 21012	Cumberland	1969	29,199

SCRANTON/WILKES-BARRE:

	ROUTE	FEATURES INTERSECTED	LOCATION	COUNTY	YEAR BUILT	ADT
1	SR 2004 N.RIVER ST	RAILROAD-POCONO N.E.	PLAINS TWP	Luzerne	1909	19,988
2	SR3019 LONESME RD	BRANCH LACKAWANNA RIVER	OLD FORGE BORO	Lackawana	1941	11,976
3	SR 2004 RIVER ST	MILL CREEK	W.-BARRE	Luzerne	1929	19,988
4	SR 3013	D&H RAILROAD	TAYLOR-BORO	Lackawana	1934	15,080
5	SR 1021 EIGHTH ST	SUSQUEHANNA RIVER	JENKINS TWP	Luzerne	1900	12,005
6	SR 0006 TR 6 & 11	SR 0632 TR 632	DALTON BORO	Lackawana	1952	14,075
7	SR 0309	TOBY CREEK	KINGSTON TP	Luzerne	1941	19,434
8	SR 0093 TR 93	NESCOPECK CREEK	SUGARLOAF TWP	Luzerne	1937	11,620
9	HARRISON AV	ROARING BR-RR	SCRANTON CTY	Lackawana	1935	16,843
10	SR 2004	COAL MINE	PLAINS TWP	Luzerne	1930	19,988
11	LACKA AVE NO 14	LACKA RIVER & D&H RR	SCRANTON	Lackawana	1940	15,000
12	SR 6006	SR347	BLAKELY BORO	Lackawana	1941	16,240
13	ELM STR BR NO 2	LACKAWANNA RIVER	SCRANTON	Lackawana	1958	10,000
14	SR 3013 (MAIN ST)	LACKAWANNA RIVER	OLD FORGE BOR	Lackawana	1940	12,433
15	SR 6006	RUSHBROOK CREEK SR 107	MAYFIELD BORO	Lackawana	1938	10,551
16	SR 0081 I-81 NB	RR & STAFFORD MEADOW BR	SCRANTON CTY	Lackawana	1963	37,099
17	SR 0924 TR 924	I-81 NB & SB	HAZLE TWP	Luzerne	1967	10,003
18	SR 0006 TR 6 & 11	OUTLET OF GLENBURN POND	GLENBURN TWP	Lackawana	1952	14,075
19	SR 0309	TOBY CREEK	KINGSTON TP	Luzerne	1941	19,434
20	SR 0011 TR 11	HARVEYS CREEK	PLYMOUTH TP	Luzerne	1929	17,000
21	SR 0081 I-81 NB&SB	D&H RAILROAD & LACK RIVR	SCRANTON OVER RR&LACK RVR	Lackawana	1958	62,680
22	SR 0081 I-81 SB	STAFFORD MEADOW BR	SCRANTON CTY 3016	Lackawana	1963	35,292
23	SR 0315 TR 315	MILL CREEK	PLAINS TWP	Luzerne	1930	16,134
24	SR 0011 TR 11	ABANDONED RAILROAD	LARKSVILLE	Luzerne	1955	17,348
25	SR 0081 I-81 SB	TWP RD 444 SCOTT RD	S ABINGTN	Lackawana	1961	19,581
26	SR 0080 I-80 EB	NESCOPECK CREEK	BLACK CREEK TWP	Luzerne	1965	15,698
27	SR 0080 I-80 WB	NESCOPECK CREEK	BLACK CRK	Luzerne	1965	15,611
28	SR 0924 TR 924	CONRAIL	HAZLE TWP	Luzerne	1967	10,814
29	SR 0081 I-81 SB	TR 438 & TUNKHNOCK CREEK	SCOTT TWP	Lackawana	1961	14,628
30	SR 0081 I-81 NB	TR 438 & TUNKHANNOCK CK	SCOTT TWP	Lackawana	1961	12,953
31	SR 0081 I-81 NB	LIDYS ROAD	DUPONT BORO	Luzerne	1963	25,026
32	SR 0081 I-81 SB	LIDYS ROAD	DUPONT BORO	Luzerne	1963	24,992

33	SR 0080 I-80 EB	LINESVILLE CREEK	WHITE HAVN	Luzerne	1966	10,865
34	SR 0081 I-81 NB	SR 8005	SCRANTON CITY	Lackawana	1966	36,041
35	SR 0006 TR 6 & 11	S BR TUNKHANNOCK CREEK	LAPLUME TWP	Lackawana	1954	14,150
36	SR 0081 I-81 SB	SR 3031	MOOSIC BORO	Lackawana	1963	31,920
37	SR0029 TR 29 NB&SB	TWP RD, CRK	HANOVER TWP	Luzerne	1969	14,959

PHILADELPHIA:

	ROUTE	CROSSING	LOCATION	COUNTY	YEAR BUILT	ADT
1	LINDBERGH BLVD.	CSX RAILROAD	LINDBERGH BLVD	Philadelphia	1902	25,740
2	ASHMEAD ROAD	TACONY CREEK	TACONY CK.CROSSING	Montgomery	1936	12,000
3	TORRESDALE AVENUE	ACADEMY ROAD	ACADEMY RD.EXT.	Philadelphia	1964	12,337
4	MAIN STREET	SEPTA(LEASED TO CONRAIL)	SELLERSVILLE BORO.	Bucks	1927	11,015
5	HOLME AVENUE	CONRAIL;BUSTLETON BRANCH	NEAR ARTHUR STREET	Philadelphia	1921	21,740
6	HENRY AVENUE	BIKE PATH,WISSAHICKON	WEST VALLEY AVE.	Philadelphia	1958	38,286
7	LOWER STATE ROAD	NESHAMINY CREEK	SW.OF DOYLESTOWN	Bucks	1930	13,277
8	SOUTH ST.(WEST APP	SEPTA (W CHES BR),CONRAI	SOUTH ST (WEST APR)	Philadelphia	1923	18,600
9	SUMNEYTOWN PIKE	UNAMI CREEK	1.5MI.E.OF PA.-29	Montgomery	1928	11,661
10	SCHUYLKILL AV WEST	SCHUYLKILL EXPRESSWAY	E.SIDE OF 30TH ST.	Philadelphia	1933	23,310
11	CONNECT PA32&NJ29	DELAWARE RIVER	MORRISVILLE BORO.	Bucks	1884	21,397
12	MAIN STREET	STONY CREEK	350W.TR202 SOUTH	Montgomery	1854	16,826
13	TRAFFIC ROUTE 13	NEWBOLD ROAD & CONRAIL	1MI.S.MORRISVILL	Bucks	1954	30,101
14	RAMP F	RIDGE AVENUE	GUSTINE LAKE INTER.	Philadelphia	1964	28,568
15	KREWSTOWN ROAD	PENNYPACK CREEK	KREWSTOWN ROAD	Philadelphia	1907	10,000
16	JFK BLVD.	SCHUYLKILL RIVER;CSX RR	30TH STREET STA.	Philadelphia	1959	21,525
17	POTTSTOWN BY-PASS	CONRAIL	LOWER POTTSGROVE	Montgomery	1965	41,833
18	WEST MAPLE AVENUE	NESHAMINY CREEK	L.SOUTHAMPTON	Bucks	1929	13,614
19	2ND STREET	AMTRAK (NE CORRIDOR)	N.VENANGO STREET	Philadelphia	1926	14,600
20	ADAMS AVENUE	TACONY CREEK	WEST TRAIN STATION	Philadelphia	1901	17,948

21	COUNTY LINE ROAD	WEST BR NESHAMINY CREEK	LINE LEXINGTON	Bucks	1937	16,185
22	STENTON AVENUE	WISSAHICKON CREEK	W.WISSAHICKON AVE.	Montgomery	1914	10,116
23	BRISTOL ROAD	BR.LITTLE NESHAMINY CR.	1/4 W.IVYLAND BORO.	Bucks	1923	16,591
24	COTTMAN AVENUE	CSX-N Y SHORT LINE	NR.RISING SUN AVE.	Philadelphia	1905	29,238
25	MARKET STREET	SCHUYLKILL EXPWY.&AMTRAK	30TH STREET STA.	Philadelphia	1932	21,446
26	BUTLER PIKE	WEST BR.NESHAMINY CREEK	.5MI.SOUTH TR-152	Bucks	1924	20,754
27	RICHBORO ROAD	NESHAMINY CREEK	1MI.S.NEWTOWN BORO	Bucks	1938	20,607
28	DEKALB PIKE	NORFOLK SOUTHERN	S.SCHUYLKILL RIVER	Montgomery	1928	27,728
29	TOWNSHIP LINE ROAD	STONY CREEK	NORTH NORRISTOWN	Montgomery	1933	12,544
30	LINCOLN DRIVE	RIDGE AVE;RMPS F;D	WISSAHICKON AVE.	Philadelphia	1964	48,080
31	INTERSTATE 95 N.B.	POQUESSING CR & GRANT AV	NR.GRANT AVENUE	Philadelphia	1965	67,428
32	SWAMP ROAD	BRANCH NESHAMINY CREEK	BUCKS COUNTY COMM.	Bucks	1936	12,994
33	RAMP A;PA.TPK(276)	BRISTOL PIKE,RT13;DB-255	DELA.VALLEY INTER.	Bucks	1956	36,324
34	TRENTON AVENUE	ROCK RUN	.5MI.NORTH US-1	Bucks	1920	13,434
35	EASTON ROAD	DEEP RUN	1.MI.N.PIPERSVILLE	Bucks	1950	13,320
36	WOODHAVEN ROAD	ACADEMY ROAD	EAST OF ROUTE 1	Philadelphia	1965	63,800
37	ARMAND HAMMER BLVD	CONRAIL	SOUTH HIGH STREET	Montgomery	1942	15,746
38	CHURCH ROAD	SEPTA	NR.READING STATION	Montgomery	1931	13,685
39	OLD YORK ROAD	SEPTA	ABINGTON;JENKINTWN.	Montgomery	1905	29,214
40	GRAVEL PIKE	SWAMP CREEK	1MI.S.ZIEGLERSVIL.	Montgomery	1947	13,061

PITTSBURGH:

	ROUTE	FEATURES INTERSECTED	LOCATION	COUNTY	YEAR BUILT	ADT
1	FORT PITT BL	MON WHARF LOT	301035 FORT PITT BLVD(EB)	Allegheny	1940	15,955
2	142-RAMP FR BLVD/A	FORBES AVE	LR 120 OVER FORBES AVE	Allegheny	1920	21,242
3	ALLIES BL	MAURICE ST, RAMP, FORBES	BLV ALLIES OVER FORBES AV	Allegheny	1928	21,843
4	BAPTIST RD	NORFOLK & WESTERN RR.	BETHEL PARK O/N&W RR.	Allegheny	1913	12,036
5	BRADDOCK AV	NORFOLK SOUTHERN RR	P09202 KENMAWR BRIDGE	Allegheny	1910	15,000
6	BABCOCK BL	GIRTYS RUN	1/2 MI.N.W.OF SR 4002	Allegheny	1930	13,094

7	N AVE&BRIGHTON RD	N-S RR-ALLEGHENY PARK	301067 N AVE-BRIGHTON RD	Allegheny	1905	21,000
8	MOSSIDE BL	LOCAL SERVICE ROAD	AT MOSSIDE BRIDGE	Allegheny	1930	16,285
9	MOUNT NEBO RD	I-79 NB-SB	MT NEBO INTERCHANGE	Allegheny	1971	12,592
10	LIBRARY RD	SAW MILL RUN	PITTSBURGH @ 51&88	Allegheny	1930	20,000
11	LR02287,SR2082	(I-76);B&LE RR;WB-445	EAST OF ALLEGHENY RIVER	Allegheny	1952	18,092
12	LINCOLN WY	LONG RUN	1260' EAST OF SR 0048	Allegheny	1930	16,772
13	GIBSONIA RD	WILLOW RUN	AT GRUBBS RD(T-584)	Allegheny	1930	11,230
14	WILLIAM FLYNN HW	PINE CREEK	600'SOUTH OF DUNCAN AVE.	Allegheny	1959	17,828
15	MOSSIDE BL	NSC RR, SERVICE RDS.,CR.	MOSSIDE BLVD.BRIDGE	Allegheny	1930	16,285
16	RAYMOND P SHAFE HW	MINGO RD	JUST N OF WEXFORD INTERCH	Allegheny	1972	30,695
17	WEST CARSON ST	FILL AREA	1/2 MI.N.W.CORLISS TUNNEL	Allegheny	1926	15,577
18	LYSLE BL	CROOKED RUN	500'S.OF N.INTER/W SR2037	Allegheny	1937	20,381
19	RAYMOND P SHAFR HW	CHARTIERS CREEK	1016NB OVER CHARTIERS CRK	Allegheny	1965	29,326
20	RANKIN BR	SR837EX,3 RR'S,KENMARAVE	MA0735 RANKIN BR-MAIN STR	Allegheny	1951	25,074
21	SR 0028 SH	CSX RAILROAD	ETNA BORO OVER B&O RR.	Allegheny	1960	60,050
22	BUTLER ST	FILLED IN RAVINE	PGH - HETHS RUN BR NR ZOO	Allegheny	1914	13,571
23	T-725THORN HILL RD	PA TURNPIKE(I-76)WB-400	WEST OF WARRENDALE	Allegheny	1952	22,384
24	OHIO RIVER BL	BEAVER AVE.TURNAROUND	19-65 O/BEAV.AVE.TURNRND	Allegheny	1969	34,134
25	OHIO RIVER BL	BIRMINGHAM AVE	2.5 MI.S.E.OF SR 0079	Allegheny	1930	19,938
26	CORAOPOLIS BLVD	TWP.RD.142 & MONTOUR RUN	OVER TWP.RD.142	Allegheny	1929	27,407
27	CURRY HOLLOW RD	CSX RAILROAD	PLEASANT HILLS-OVER RR	Allegheny	1939	31,326
28	SAW MILL RUN BL	WEYMAN RUN	125' SOUTH OF PROVOST RD.	Allegheny	1931	26,582
29	TARENTUM BR	ABAND.RR.,RPS.C&D,RIVER	A9801 O/RR.,RPS.C&D,RIVER	Allegheny	1949	32,806
30	SAW MILL RUN BL	WEYMAN RUN	250' SOUTHEAST OF SR 0088	Allegheny	1931	35,555
31	OHIO RIVER BL	FOREST AVE.	2 MI.S.E.OF SR 0079	Allegheny	1930	19,938
32	LR02176,SR 2054	PA TURNPIKE(I-76);WB-461	NEAR PITTSBURGH INTERCHG	Allegheny	1952	11,970
33	CLAIRTON BL	TR. 51 OVER LEWIS RUN	500 FT SO SR 2032WIS RUN	Allegheny	1958	27,344
34	FREEPORT RD	ABANDONED RR TRACK	BARGE BASIN O/ABNDONED RR	Allegheny	1928	24,908

35	MCKEESPORT BL	UNION RAILROAD	DRAVOSBURG OVER UNION RR	Allegheny	1960	18,268
36	RAYMOND P SHAFR HW	CHARTIERS CREEK	1016SB OVER CHARTIERS CRK	Allegheny	1965	29,943
37	CASTLE SHANNON BL	SAW MILL RUN	300'N.W.OF INTER.W/TR 88	Allegheny	1900	17,710
38	CENTER AV	FALLEN TIMBER RUN	500 FT EAST OF 51	Allegheny	1952	13,416
39	WILLIAM FLYNN HW	GOURDHEAD RUN	.5 MI. SOUTH OF SR 1010	Allegheny	1931	18,737
40	SR 0028 SH	COAL CO RD & BARGE BASIN	1037 NB OVER BARGE BASIN	Allegheny	1971	21,220

TRIP has also compiled a list of overall bridge conditions in each Pennsylvania county. Clearfield County has the highest percentage of structurally deficient bridges in the state, with 45 percent of its bridges in need of repair or replacement. It is followed by, respectively, McKean, Lawrence, Cameron, Potter, Butler, Wyoming, Beaver, Armstrong, and Elk counties. A full list of the percentage and number of structurally deficient and functionally obsolete bridges in each county can be found in Appendix B.

Table 6. Deficient bridges by county.

COUNTY	TOTAL NUMBER OF BRIDGES	TOTAL STRUCTURALLY DEFICIENT	PERCENT STRUCTURALLY DEFICIENT
CLEARFIELD	288	131	45%
MCKEAN	207	94	45%
LAWRENCE	260	118	45%
CAMERON	58	25	43%
POTTER	193	79	41%
BUTLER	364	142	39%
WYOMING	137	50	36%
BEAVER	283	97	34%
ARMSTRONG	265	89	34%
ELK	108	36	33%

Source: 2001 National Bridge Inventory (FHWA)

Travel Trends

Significant growth in passenger vehicle travel and, in particular, of commercial trucking during the last decade has tremendously increased wear and tear on Pennsylvania's bridges. From 1991 to 2001, vehicle miles of travel (VMT) in Pennsylvania increased by 18 percent, from 87 billion to 103 billion miles. TRIP estimates that VMT will increase another 30 percent by the year 2020. Truck freight is a significant part of the vehicle travel on Pennsylvania's roads and bridges, with commercial trucks accounting for 11 percent of vehicle travel in the state in 2001, according to the FHWA. Large truck travel in Pennsylvania is expected to increase by 33 percent by 2020.

Significant increases in passenger vehicle and combination-truck travel will accelerate the rate of deterioration on bridges, increasing the need for timely maintenance, repairs and reconstruction. Truck travel is steadily rising in the United States as companies increasingly use just-in-time manufacturing and warehousing, which puts more trucks on the road.

Economic Development

Pennsylvania's economy is literally riding on it's roads and bridges, with 88 percent of the $297 billion worth of commodities delivered annually from sites in Pennsylvania transported on the state's bridges and highways. A safe, efficient transportation system is crucial to attracting and keeping businesses in Pennsylvania. Deficient bridges can harm a region's economic development by reducing access, particularly for large commercial vehicles, which are critical to business productivity.

Pennsylvania Bridge Funding Needs

Though many of Pennsylvania's bridges are in need of repair or replacement, state and federal budget constraints do not allow for an aggressive schedule of maintenance and replacement. According to the Federal Highway Administration's National Bridge Inventory, the cost to fix Pennsylvania structurally deficient bridges is $4.9 billion. The cost to repair all functionally obsolete bridges is $2.1 billion.

Strategies to Improve Bridge Conditions

Improving Pennsylvania's bridges will require that all levels of government invest adequately in maintaining their bridges and that the money is spent wisely. Three steps that can help facilitate this are:

- ✓ Increase bridge investment statewide to allow for an expanded program of bridge repair and replacement.
- ✓ Expand the current bridge maintenance program to slow the rate of bridge deterioration by reducing the amount of damage occurring from precipitation and traffic wear.
- ✓ Consider the use of high-performance materials, such as improved steel, concrete and fiber products, which may result in lower lifecycle costs by building or re-constructing bridges that can last longer and carry larger traffic volumes.

Conclusion

The deterioration of Pennsylvania's bridges is a visible sign of an aging and over-burdened transportation system. The continued travel and economic growth of the past decade, coupled with the projected population growth over the next 20 years, has created a challenge to the state's transportation system, and the bridges that link it together. An efficient and safe transportation system is crucial to a high quality of life for Pennsylvania residents, but that system will perform only as well as its bridges allow.

Pennsylvania's bridges face two problems – they are aging and traffic levels, particularly commercial trucking, are increasing at a significant rate, putting more wear and tear on many bridges than they were designed to handle. Bridges are the vital link in Pennsylvania's transportation system. Spending adequately to improve their condition and insuring that the money is spent wisely will be rewarded many times over in the form of safe, reliable transportation.

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