

Iowa's Deficient Bridges

*Strategies to improve and maintain the
condition of Iowa's bridges*

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Founded in 1971, The Road Information Program (TRIP) ® of Washington, DC is a nonprofit organization that researches, evaluates and distributes economic and technical data on highway transportation issues. TRIP is supported by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Iowa's bridges form a vital link in the state's transportation system, connecting communities and businesses and allowing for people and commerce to flow freely through the state. However, the state's bridges are aging and overburdened, and many are in need of significant repair or even replacement. Despite the tremendous needs for bridge improvements in Iowa, current transportation funding is insufficient to keep pace with the rate of bridge deterioration.

This report examines the current condition of Iowa's bridges, as well as future bridge conditions under current transportation funding levels. Also included in the report is a list of the 100 state maintained bridges in Iowa that have the lowest rating, based on condition, design and level of traffic.

The major findings of the report include:

Statewide Bridge Conditions

Federal bridge inspection data released this month found that Iowa has the fourth-highest percentage of structurally deficient bridges in the nation, behind only Pennsylvania, Oklahoma, and Rhode Island. More than one-fifth of the state's bridges are rated as structurally deficient and in need of immediate repair or replacement because of deterioration. An additional six percent of Iowa's bridges are functionally obsolete because they no longer meet current design and safety standards.

- Twenty-one percent (5,153) of Iowa's bridges are structurally deficient, showing significant deterioration to decks and other major components.
- 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 restricted to carrying 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. Iowa's bridge safety inspection program 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.
- Six percent (1,455) of Iowa's bridges are rated as functionally obsolete. A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand.

- There are 24,776 bridges in Iowa at least 20 feet in length. These bridges are required to be inspected regularly, usually every two years. They are maintained by state or local government.

State-Maintained Bridge Conditions

Iowa is falling behind in maintaining its state-maintained bridges, with the current rate of repairs being inadequate to keep up with the rate of deterioration. The cost to maintain, repair or replace deficient bridges is escalating sharply due to the rising cost of construction materials.

- The current cost of making all needed repairs to existing structurally deficient state-maintained bridges is approximately \$257 million.
- With current funding, the Iowa Department of Transportation (IDOT) is able to significantly repair or replace an average of 20 bridges annually. However, the number of bridges annually repaired or replaced will drop to just 15 in 2008. IDOT estimates that, on average, between 20 and 30 state-maintained bridges become structurally deficient each year.
- A significant number of state maintained Iowa bridges are close to becoming structurally deficient if needed repairs are not made. According to IDOT calculations, 622 state-maintained bridges have a deck, superstructure or substructure rating of five, which is within one point of being classified as structurally deficient.
- The cost of roadway improvements is escalating, in part because the price of key materials needed for highway and bridge construction has increased rapidly. Over the past three years, the average cost of materials used for highway construction, including asphalt, concrete, steel and diesel fuel, has increased by 43 percent.

Iowa's Lowest Rated Bridges

TRIP has compiled a list of the 100 state-maintained bridges in Iowa (carrying at least 2,500 vehicles per day) that have the lowest rating based on condition, design and traffic volume.

- Individual components of the bridge are rated on a scale from 0-9 with those scores figuring into the overall rating. Typically, the deck of a bridge, the superstructure and the substructure are rated based on their physical condition, with 0 being the worst rating. The full scale is included in the report.
- Below is a list of the 25 state-maintained bridges that have the lowest rating based on condition, design and traffic volume. A list of the 100 lowest rated state-maintained bridges can be found in the report.

	Route		Route or	Average	Year	Composite	Deck	Superstructure	Substructure
	Carried	County	feature intersected	Daily Traffic	built	Rating	Rating	Rating	Rating
1	30	Tama	SMALL NATURAL STREAM	4,350	1951	3	3	3	5
2	65	Hardin	IOWA RIVER	9,700	1928	4	4	3	4
3	6	Iowa	SMALL NATURAL STREAM	3,320	1929	7	5	6	4
4	63	Lyon	OVER UP RR	3,490	1936	7	4	3	4
5	29	Pottawattamie	HONEY CREEK	21,200	1958	7	6	3	4
6	29	Pottawattamie	HONEY CREEK	21,200	1958	8	6	3	4
7	169	Kossuth	E FORK DES MOINES RIVER	9,700	1954	10	5	4	6
8	92	Pottawattamie	MIDDLE SILVER CREEK	5,800	1953	15	5	4	4
9	12	Woodbury	OVER RR,RVR, STS	26,400	1936	17	4	5	5
10	12	Woodbury	OVER ABANDONED RR	13,200	1954	17	3	5	4
11	18	Clay	LITTLE SIOUX RIVER	4,120	1931	18	6	4	6
12	34	Jefferson	MITCHELL CREEK	7,100	1919	19	5	5	4
13	926	Webster	DES MOINES RIVER	7,000	1959	19	4	4	3
14	92	Pottawattamie	KEG CREEK	4,900	1953	20	4	5	4
15	35	Polk	OVER RR,TRUE PKWY,CREEK	56,700	1957	22	4	6	4
16	80	Cass	OVER US 71 & ABAND RR	19,500	1960	26	5	4	3
17	80	Cass	OVER US 71 & ABAND RR	19,500	1960	26	5	4	3
18	30	Greene	LITTLE BEAVER CREEK	3,800	1921	27	4	4	5
19	30	Tama	DEER CREEK	8,400	1953	29	4	4	5
20	30	Greene	BUTTRICK CREEK	3,770	1957	30	4	6	4
21	6	Muscatine	WEST WAPSINONOC CREEK	4,310	1927	30	6	4	5
22	149	Wapello	CEDAR CREEK	3,970	1922	30	6	6	4
23	6	Pottawattamie	OVER UP&CC RR & STREETS	33,900	1955	31	5	5	4
24	30	Boone	BEAVER CREEK	3,800	1929	32	5	4	4
25	34	Jefferson	OVER BNSF RR	5,400	1955	33	4	6	4

Importance of Bridges to Iowa's Economy

Iowa'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 Iowa are impacted by rising levels of highway travel, especially commercial trucking, which accounts for an increasing amount of overall vehicle travel.

- Approximately \$115 billion in goods are shipped from sites in Iowa and another \$89 billion are shipped to sites in Iowa, mostly by trucks on the state's roads and bridges.
- Eighty-one percent of the goods shipped annually from sites in Iowa are carried by trucks and another five percent are carried by courier services, which use trucks for part of the deliveries. Similarly, 80 percent of the goods shipped to sites in Iowa are carried by trucks and another 11 percent are carried by courier services, which use trucks for part of their deliveries.
- Deficient bridges can harm a region's economic development by reducing access, particularly for large commercial vehicles, which are critical to business productivity. Bridges that are closed or posted for a lower weight can impede the flow of goods from farm to market, and from business to consumer.

Improving Iowa's Bridges

Strategies to keep bridges in good condition include the following:

- 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

Iowa's bridges are a critical component of the state's surface 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, while facilitating commerce and providing access for emergency vehicles.

However, many Iowa bridges are showing signs of aging and are carrying increased traffic loads. A significant number of Iowa's bridges are deteriorated or don't meet modern bridge design standards and are in need of significant repair or even replacement. But despite the tremendous needs for bridge improvements in Iowa, current state transportation funding is insufficient to reduce the number of deficient bridges in the state. In fact, at the current level of state spending on bridge repairs, the number of deficient bridges is likely to increase.

Faced with flattening revenue, 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 Iowa is exacerbated by the tremendous increases in traffic volumes, particularly of large commercial trucks, as well as the rapidly increasing cost of construction materials.

This report examines the current condition of Iowa's bridges, as well as future bridge conditions under current transportation funding levels. Also included in the report is a list of the 100 state-maintained bridges in Iowa that have the lowest ratings, based on the overall condition of the bridge, the design of the bridge and the importance of the bridge for local and regional access.

Travel Trends and Bridge Use in Iowa

Significant growth in passenger vehicle travel and, in particular, of commercial trucking has tremendously increased wear and tear on Iowa's bridges. From 1990 to 2005, vehicle miles of travel (VMT) in Iowa increased by 35 percent, from 23 billion to 31 billion miles.¹ TRIP estimates that VMT will increase another 30 percent by the year 2020.² In addition to growth in VMT, Iowa's population increased seven percent from 1990 to 2006.³

Truck freight is a significant component of vehicle travel on Iowa's roads and bridges. Large truck travel in Iowa is expected to increase by 41 percent by 2020.⁴ 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, resulting in increased freight traffic.

Bridge Conditions and Economic Development

Iowa's economy is literally riding on its roads and bridges, with \$115 billion in goods shipped from sites in Iowa and another \$89 billion shipped annually to sites in Iowa, mostly by trucks on the state's roads and bridges.⁵ Eighty-one percent of the goods shipped annually from sites in Iowa are carried by trucks and another five percent are carried by courier services, which use trucks for part of the deliveries. Similarly, 80 percent of the goods shipped to sites in Iowa are carried by trucks and another 11 percent are carried by courier services, which use trucks for part of their deliveries.⁶

A safe, efficient transportation system is crucial to attracting and keeping businesses in Iowa. Deficient bridges can harm a region's economic development by reducing access, particularly for large commercial vehicles, which are critical to business productivity. Bridges that are closed or posted for a lower weight can impede the flow of goods from farm to market, and from business to consumer.

The Condition of Iowa's Bridges

Iowa's 24,776 bridges are maintained by a combination of state and local governments. Iowa has the fourth-highest percentage of structurally deficient bridges in the nation, behind Pennsylvania, Oklahoma and Rhode Island.⁷ State, county and municipal governments in Iowa are responsible for maintaining, repairing or replacing these bridges. All bridges in the nation, at least 20 feet in length, are required to be inspected regularly, typically every two years.

According to the Federal Highway Administration's National Bridge Inventory, 21 percent (5,153) of Iowa's bridges were structurally deficient as of December, 2007.⁸ A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. A structurally deficient bridge typically requires significant maintenance or repair to return it to good condition. Bridges that are structurally deficient are often restricted to carrying 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. The state's bridges are inspected on a regular basis. If they are found to be deficient, they may be restricted to carrying lower weight vehicles or closed.⁹

Pennsylvania leads the country in the percentage of its bridges rated structurally deficient in 2007. It is followed by, respectively, Oklahoma, Rhode Island, and Iowa. Nationally, 12 percent of bridges are structurally deficient.¹⁰

Chart 1. Top four states with highest percentage of bridges rated structurally deficient, 2007.

Pennsylvania	26%
Oklahoma	25%
Rhode Island	22%
Iowa	21%

Source: TRIP analysis of December 2007 FHWA data

In addition to structurally deficient bridges, an additional six percent (1,455) of Iowa's bridges are functionally obsolete.¹¹ Functionally obsolete bridges are those that do not meet current design standards for lane widths, shoulder widths or vertical clearances, or are inadequate to handle current traffic demand.¹²

Bridge deficiencies have a significant 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.

Iowa's Lowest Rated Bridges

TRIP has prepared a list of the 100 state-maintained bridges in Iowa that have the lowest rating, based on condition, design and traffic volume.

The rating is calculated using a formula defined in Federal Highway Administration's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. This rating is indicative of a bridge's sufficiency to remain in service. The formula places 55 percent value on the structural condition of the bridge, 30 percent on its serviceability and obsolescence, and 15 percent on its essentiality to public use.¹³

The bridge's rating provides an overall measure of the bridge's condition. Bridges are considered structurally deficient if significant load carrying elements are found to be in poor condition due to deterioration.

Major components of the bridge, such as the deck, substructure and superstructure are also rated on a scale from 0-9. If any component is rated from 0-4, the bridge is rated as structurally deficient. The following chart describes the rating scale applied to bridge components.

Chart 2. Bridge component rating scale description

0	Failed condition
1	Imminent failure condition
2	Critical condition
3	Serious condition
4	Poor condition
5	Fair condition
6	Satisfactory condition
7	Good condition
8	Very good condition
9	Excellent condition

Source: Federal Highway Administration

In evaluating bridge conditions in Iowa, TRIP obtained data for state-maintained bridges, as this is the most critical and most heavily used section of the system. The state-maintained system in Iowa accounts for 10 percent of lane miles in the state, yet carries 61 percent of all traffic.¹⁴ Below is a list of the 100 state-maintained bridges in Iowa (carrying at least 2,500 vehicles per day) that have the lowest rating.

Chart 3: Iowa's 100 state-maintained bridges with the lowest rating.

	Route Carried	County	Route or feature intersected	Average Daily Traffic	Year built	Composite Rating	Deck Rating	Superstructure Rating	Substructure Rating
1	30	Tama	SMALL NATURAL STREAM	4,350	1951	3	3	3	5
2	65	Hardin	IOWA RIVER	9,700	1928	4	4	3	4
3	6	Iowa	SMALL NATURAL STREAM	3,320	1929	7	5	6	4
4	63	Lyon	OVER UP RR	3,490	1936	7	4	3	4
5	29	Pottawattamie	HONEY CREEK	21,200	1958	7	6	3	4
6	29	Pottawattamie	HONEY CREEK	21,200	1958	8	6	3	4
7	169	Kossuth	E FORK DES MOINES RIVER	9,700	1954	10	5	4	6
8	92	Pottawattamie	MIDDLE SILVER CREEK	5,800	1953	15	5	4	4
9	12	Woodbury	OVER RR,RVR, STS	26,400	1936	17	4	5	5
10	12	Woodbury	OVER ABANDONED RR	13,200	1954	17	3	5	4
11	18	Clay	LITTLE SIOUX RIVER	4,120	1931	18	6	4	6
12	34	Jefferson	MITCHELL CREEK	7,100	1919	19	5	5	4
13	926	Webster	DES MOINES RIVER	7,000	1959	19	4	4	3
14	92	Pottawattamie	KEG CREEK	4,900	1953	20	4	5	4
15	35	Polk	OVER RR,TRUE PKWY,CREEK	56,700	1957	22	4	6	4
16	80	Cass	OVER US 71 & ABAND RR	19,500	1960	26	5	4	3
17	80	Cass	OVER US 71 & ABAND RR	19,500	1960	26	5	4	3
18	30	Greene	LITTLE BEAVER CREEK	3,800	1921	27	4	4	5
19	30	Tama	DEER CREEK	8,400	1953	29	4	4	5
20	30	Greene	BUTTRICK CREEK	3,770	1957	30	4	6	4
21	6	Muscatine	WEST WAPSINONOC CREEK	4,310	1927	30	6	4	5
22	149	Wapello	CEDAR CREEK	3,970	1922	30	6	6	4
23	6	Pottawattamie	OVER UP&CC RR & STREETS	33,900	1955	31	5	5	4
24	30	Boone	BEAVER CREEK	3,800	1929	32	5	4	4
25	34	Jefferson	OVER BNSF RR	5,400	1955	33	4	6	4
26	6	Pottawattamie	KEG CREEK	3,580	1953	33	4	6	5
27	218	Benton	MUD CREEK	2,950	1957	35	4	4	6
28	30	Greene	OVER UP RR	3,710	1957	35	5	4	5
29	65	Polk	OVER RR YARD & SCOTT AVE	30,900	1937	35	5	4	4
30	6	Dallas	SOUTH RACCOON RIVER	4,800	1950	36	4	5	6
31	52	Dubuque	OVER US 52	7,200	1957	36	5	4	5
32	151	Iowa	SMALL NATURAL STREAM	5,900	1930	36	6	6	4
33	218	Benton	PRATT CREEK	2,810	1926	37	N	N	N
34	80	Cedar	CEDAR RIVER	32,600	1960	37	4	4	6
35	150	Buchanan	BEAR CREEK	4,520	1954	38	4	4	6
36	34	Jefferson	BIG CEDAR CREEK	5,400	1955	38	5	6	4
37	34	Jefferson	SHIRTZ CREEK	7,100	1951	38	5	5	4
38	92	Pottawattamie	LITTLE SILVER CREEK	4,900	1953	38	5	5	4
39	69	Decatur	OVER ABANDON RR	4,010	1952	39	4	6	4
40	30	Greene	NORTH RACCOON RIVER	3,290	1957	39	4	5	5
41	35	Polk	OVER GRAND AVE	43,100	1957	39	4	6	4
42	80	Adair	OVER IAIS RR	20,100	1958	40	4	6	4
43	80	Adair	OVER IAIS RR	20,100	1958	40	4	5	4
44	163	Polk	CAMP CREEK	11,000	1960	42	3	5	4
45	63	Wapello	DM RIVER, Streets BNSF RR	23,800	1964	42	4	4	4
46	71	Audubon	EAST NISHNABOTNA RIVER	2,600	1959	43	4	5	4
47	141	Polk	OVER IAIS RR	9,900	1958	44	4	5	5
48	80	Cedar	CEDAR RIVER	32,600	1960	45	4	4	6
49	80	Polk	OVER US 65	39,800	1959	45	5	5	4
50	80	Pottawattamie	WEST NISHNABOTNA RIVER	22,400	1965	45	6	5	4

51	30	Story	OVER UP RR	13,700	1963	45	5	6	4
52	57	Black Hawk	SMALL NATURAL STREAM	2,660	1919	46	5	5	4
53	80	Cass	CROOKED CREEK	19,500	1958	46	4	5	4
54	35	Polk	OVER GRAND AVE	43,100	1957	46	4	5	4
55	130	Sac	OVER I-80	11,400	1959	46	6	6	4
56	80	Cass	770th STREET	19,700	1958	47	6	5	4
57	30	Linn	CEDAR RIVER	20,200	1953	47	7	4	7
58	17	Polk	DES MOINES RIVER	5,200	1959	47	4	5	5
59	6	Pottawattamie	MOSQUITO CREEK	8,200	1968	47	6	5	4
60	92	Warren	OVER I-35	4,810	1959	47	5	4	5
61	35	Warren	NORTH RIVER	22,000	1957	47	6	6	4
62	80	Cass	INDIAN CREEK	20,400	1966	48	5	5	4
63	80	Cass	CROOKED CREEK	19,500	1958	48	5	5	4
64	235	Polk	DES MOINES RIVER AND RD	72,700	1962	48	4	5	4
65	80	Pottawattamie	OVER BNSF RR, RD & CREEK	25,200	1968	48	6	5	4
66	30	Tama	MUD CREEK	5,100	1931	49	5	5	4
67	926	Webster	OVER CC RR AND 11TH	21,200	1977	49	7	4	5
68	169	Webster	OVER CC RR	9,000	1960	49	4	7	4
69	80	Cass	770th STREET	19,700	1958	50	6	5	4
70	14	Marion	DES MOINES RIVER & RES.	3,750	1965	50	7	4	6
71	80	Poweshiek	OVER IOWA 146	24,300	1962	50	4	6	4
72	69	Story	OVER US 69 (GRAND AVE.)	2,600	1938	50	5	6	4
73	92	Muscatine	MISSISSIPPI RIVER & RR	3,930	1972	51	6	4	6
74	75	Plymouth	SMALL NATURAL STREAM	13,000	1948	51	6	6	4
75	6	Polk	DES MOINES RIVER	22,600	1933	51	4	6	5
76	169	Webster	OVER CC RR	9,000	1960	51	5	7	4
77	169	Webster	LIZARD CREEK	9,000	1960	51	4	5	4
78	163	Polk	E FOUR MILE CREEK & RR	18,700	1965	52	4	5	7
79	1	Johnson	IOWA RIVER	23,000	1969	53	6	7	4
80	75	Plymouth	DRAINAGE DITCH	11,800	1948	53	4	4	4
81	75	Plymouth	DRY CREEK	11,800	1948	53	4	4	5
82	30	Boone	DES MOINES RIVER	6,600	1963	54	5	4	7
83	30	Boone	DES MOINES RIVER	6,600	1963	54	5	4	6
84	80	Jasper	NORTH SKUNK RIVER	27,700	1962	54	5	4	7
85	169	Webster	LIZARD CREEK	9,000	1960	54	5	6	4
86	30	Boone	MIDDLE BEAVER CREEK	3,800	1917	55	4	5	6
87	34	Clarke	OVER I-35	7,300	1959	55	4	5	5
88	59	Crawford	BOYER RIVER	8,000	1967	55	5	7	4
89	34	Lucas	over BNSF & UP RR'S	2,920	1960	55	6	5	4
90	926	Webster	OVER CC RR & 2ND ST SW	7,000	1959	55	4	5	5
91	80	Cass	DRAINAGE DITCH	19,500	1959	56	N	N	N
92	80	Polk	DRAINAGE DITCH	85,100	1958	56	N	N	N
93	30	Boone	HONEY CREEK	6,600	1962	57	N	N	N
94	80	Cass	OVER 570 th ST.	20,300	1966	57	6	6	4
95	61	Dubuque	MISSISSIPPI RIVER (ISLAND)	19,200	1982	57	6	4	6
96	9	Emmet	DES MOINES RIVER	9,100	1975	58	4	5	7
97	80	Jasper	NORTH SKUNK RIVER	27,700	1962	59	5	4	6
98	29	Woodbury	OVER UP RR & WALL ST	31,000	1959	59	6	4	4
99	80	Polk	OVER I-35 & 80	2,570	1958	60	4	6	6
100	80	Polk	OVER US 65	39,800	1959	60	4	5	5

Source: Iowa Department of Transportation

Iowa Bridge Improvements and Funding Needs

At the current pace of bridge repairs in Iowa, the overall condition of state-maintained bridges is likely to worsen. With current funding, the Iowa Department of Transportation is able to significantly repair or replace an average of 20 bridges annually, with only 15 scheduled for improvement in 2008.¹⁵ However, IDOT estimates that, on average, between 20 and 30 state-maintained bridges become structurally deficient each year.¹⁶ The current cost of making all needed repairs to existing structurally deficient state-maintained bridges is approximately \$257 million.¹⁷

A significant number of bridges in the state are close to becoming structurally deficient if needed repairs are not made. According to IDOT, 622 state-maintained bridges have a deck, superstructure and/or substructure rating of five, which is within one point of being classified as structurally deficient.¹⁸

The challenge faced by the state in funding needed projects could be made more difficult by the rising cost of highway construction materials. The cost of roadway improvements is escalating, in part because the price of key materials needed for highway and bridge construction has increased rapidly. Over the past three years, the average cost of materials used for highway construction, including asphalt, concrete, steel and diesel fuel, has increased by 43 percent.¹⁹

Strategies to Improve Bridge Conditions

Improving Iowa's bridges will require that all levels of government invest adequately in maintaining their bridges. The following three steps can help Iowa meet this goal :

- ✓ 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 Iowa'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, have 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 Iowa residents, but that system will perform only as well as its bridges allow.

Iowa'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 the state's bridges. Bridges are the vital link in Iowa's transportation system. Spending adequately to improve their condition will be rewarded in the form of safe, reliable transportation.

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