

Bumpy Roads Ahead

Cities with the Roughest Rides and Strategies to Make our Roads Smoother

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**The Road Information Program
1726 M Street, NW, Suite 401
Washington, DC 20036
Phone: (202) 466-6706
Fax: (202) 785-4722
www.tripnet.org**

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

The nation's major urban roadways – highways and major streets that are the main routes for commuters and commerce – are a critical link in the nation's transportation system. These major arterial routes carry 78 percent of the 1.7 trillion miles driven annually in urban America.

From commuters heading to work and children riding the school bus, to people driving to stores, church or the doctor's office, Americans depend on good roads in their communities. But there are problems on our nation's major urban streets and highways. Continued increases in travel by cars and trucks are putting significant wear and tear on these aging city roads.

In this report, The Road Information Program (TRIP) examines the condition of major roads in the nation's most populous metropolitan areas, recent trends in urban travel, and the latest developments in repairing and building roads to last longer. Pavement condition data are based on the Federal Highway Administration's (FHWA) 2002 annual survey of state transportation officials on the condition of major state and locally maintained roads, based on a uniform pavement rating index. Although there may be some variance in how transportation officials apply this index, the FHWA survey is the only national source of pavement condition ratings based on a consistent criteria. The major findings of the TRIP report are:

The condition of the nation's most critical metropolitan area roads and highways is getting worse, increasing the cost motorists are paying to maintain their vehicles as a result of driving on roads and highways with pavements in poor condition. Pavement conditions have likely gotten worse since this pavement data was collected in 2002 because state and local funding for road and bridge improvements is down 18 percent in 2004, from 2002 levels.

- One out of four (25 percent) of the nation's major metropolitan roads – interstates, freeways and other principal arterial routes – have pavements that are in poor condition. Pavement conditions on the nation's major urban roads and highways have worsened in each year since 1998, when 22 percent were in poor condition.
- The percentage of the nation's major urban roads and highways with pavements in good condition decreased from 36 percent in 1998 to 32 percent in 2002.
- The ten urban regions with at least 500,000 people, which includes the city and its surrounding suburbs, with the greatest share of major roads and highways with pavements in poor condition are: Los Angeles – 66%, San Jose – 65%, San Francisco-Oakland – 61%, San Diego – 60%, New Orleans – 56%, Boston – 54%, Sacramento – 50%, Riverside-San Bernardino – 42%, Tulsa – 41% and Philadelphia – 40%.

- The average urban motorist in the U.S. is paying \$400 annually in additional vehicle operating costs as a result of driving on roads in need of repair. Driving on roads in disrepair increases consumer costs by accelerating vehicle deterioration, increasing the frequency of needed maintenance and increasing fuel consumption.
- The 10 urban regions with at least 500,000 people, which includes the city and its suburbs, where motorists pay the most annually in additional vehicle maintenance because of roads in poor condition are: Los Angeles - \$705, San Jose - \$704, San-Francisco-Oakland - \$681, San Diego - \$674, Sacramento - \$622, New Orleans - \$621, Tulsa - \$610, Oklahoma City - \$586, Riverside-San Bernardino - \$571 and Albuquerque - \$551.
- While a desirable goal for state and local governments is to maintain 75 percent of its roads in good condition, only three of the nation's urban areas of one million people or more – Atlanta, Orlando and Jacksonville – achieve this goal. In fact, only 15 major urban areas have at least 50 percent of their major roads in good condition.
- State and local government contracts for highway and bridge improvements are down 18 percent for the eight-month period from July 2003 through February 2004, from the July 2001 through February 2002 period.

The high level of pavement deterioration on major metropolitan roads is a result of a significant increase in urban traffic, particularly from large trucks and other large vehicles, which increases the stress on key roads and highways. Further significant increases in travel in the years ahead will put further wear and tear on roads and make it even more costly to improve and maintain them.

- Overall travel on urban roads increased by 35 percent from 1990 to 2002. But urban travel by large commercial trucks grew at an even faster rate, increasing by 51 percent from 1990 to 2002. Large trucks place significant stress on road surfaces.
- Vehicle travel is expected to increase by approximately 42 percent by 2020, and the level of heavy truck travel nationally is anticipated to increase by approximately 49 percent by 2020, putting greater stress on our nation's urban roadways.

A 2002 U.S. Department of Transportation (DOT) study prepared for Congress found that urban road and highway pavement conditions are likely to get worse at current funding levels.

- The DOT study found that all levels of government are spending \$11.1 billion annually in preserving the physical condition of urban roads and highways. The report estimates that the annual investment needed to maintain urban roads and highways in their current condition is \$14.6 billion annually and that the needed annual investment to improve the condition of urban roads and highways is \$18 billion annually.
- The study found that keeping urban roadways in their current condition would require a 32 percent increase in annual funding and improving the physical condition of urban roadways would require a 62 percent increase in annual funding.

States increasingly are using improved pavements, which last longer and will reduce the need for traffic-delaying road repairs, but cost more initially. Pavement materials and designs are being tailored to withstand various climates and traffic loads. These new pavement designs and materials can result in smoother, more durable pavements, but require a larger initial investment.

- The use of thicker pavements, and more durable designs and materials for a particular roadway, are being used to increase the lifespan of road and highway surfaces and delay the need for significant repairs. These new pavements include high performance concrete pavements and Superpave hot mix asphalt pavements.
- By 2002, 60 percent of all state-funded highway resurfacing or construction projects called for the use of improved pavement materials and designs. The number of state highway projects using improved pavement mixes and designs tripled from 1998 to 2002.
- Local governments, which maintain many critical local roads and highways, still lag behind state governments in the use of improved pavement materials and designs, with only approximately 10 percent of local government road and highway projects requiring improved pavement mixtures and designs.
- Some regions are increasing the use of preventive pavement maintenance on roads while they are still in good condition to delay the need for significant repairs. These preventive maintenance treatments include sealing a road surface to prevent moisture from entering cracks in the pavement, or thin pavement overlays, improving ride quality, correcting small surface irregularities, and improving surface drainage and friction.

- A preventive maintenance approach to keeping pavements in good condition has been found to reduce overall pavement life-cycle costs by approximately one-third over a 25-year period.
- If inadequate maintenance allows potholes to form, using patching materials that are more durable and less susceptible to moisture significantly increases the life-span of a minor road repair.

The increased use of more durable, long-lasting pavement materials and the use of pavement preservation techniques to prolong pavement service life is consistent with a recent public opinion poll, which found that motorists want smoother pavements and fewer travel delays caused by work zones.

- A poll taken in 2000 by the Federal Highway Administration found that 37 percent of respondents were dissatisfied with current pavement conditions. The poll taken of more than 2,000 people, also found that 67 percent favored the use of more durable pavements; 66 percent wanted roads fixed during non-rush hours and 52 percent wanted highways and streets repaired in less time.

Congress is currently deliberating over a new six-year federal surface transportation program to succeed the current federal surface transportation program, which expires on April 30, 2004. The level of federal road and bridge funding approved will have a significant impact on the future condition of urban roads and highways. The proposed level of federal funding for highways is far below the estimated federal level of highway funding needed to maintain current road and bridge conditions and traffic congestion levels or to significantly improve the condition of roads and bridges and reduce traffic congestion levels, according to the U.S. Department of Transportation.

- The Senate has approved a new six-year federal surface transportation program that would provide \$238 billion for highways; the House of Representatives has approved a new six-year federal surface transportation program that would provide \$222 billion for highways; and the Bush Administration has proposed a new six-year federal surface transportation program that would provide \$207 billion for highways.
- The U.S. Department of Transportation estimates that the U.S. federal government needs to spend \$272 billion over the next six years to maintain current road and bridge conditions and traffic congestion levels and would need to spend \$354 billion over the next six years to make significant progress in improving road and bridge conditions and relieving traffic congestion levels.

TRIP recommends that transportation agencies are adequately funded to follow these recommendations for insuring a smooth drive:

- When critical routes are constructed or reconstructed, consider using pavement materials and designs that will provide a longer-lasting surface.
- Resurface roads in a timely fashion using pavement material that is designed to be the most durable given local climate and the level and mix of traffic on the road.
- Implement and adequately fund a pavement preservation program that postpones the need for significant rehabilitation by performing initial maintenance on road surfaces while they are still in good condition.
- Maintain an aggressive pothole repair program that uses the best patching material available, based on the severity of the pothole and the volume of traffic carried by a road or highway.
- Invest adequately to insure that 75 percent of local road surfaces are in good condition.

Introduction

The nation's urban and suburban road system is the backbone of our transportation system, allowing Americans the freedom to pursue their chosen lifestyles and for the tremendous movement of goods and services upon which our modern lives depend.

From commuters heading to work and children riding the bus to school, to people driving to stores, church or the doctor's office, Americans depend on smooth roads and highways in their communities.

But the tremendous pounding that urban roadways take daily from cars and trucks has taken a toll. From coast to coast, major streets and freeways in most U.S. communities are showing significant signs of distress. The result of this continued pounding is that one-quarter of urban streets and highways have rough pavements that provide a ride that most Americans find unacceptable. And one result of driving on these rough roads and highways is that the cost to own and maintain a vehicle increases because cars and trucks wear out more quickly, require more maintenance and consume more fuel.

This report looks at the level of smoothness of the major roads in the nation's metropolitan areas of at least 500,000 people, and the costs to motorists of driving on roads that have pavements in poor condition. Pavement condition and additional vehicle operating cost data for urban areas between 250,000 and 500,000 also are included in the appendices. Data on pavement conditions were obtained from the Federal Highway

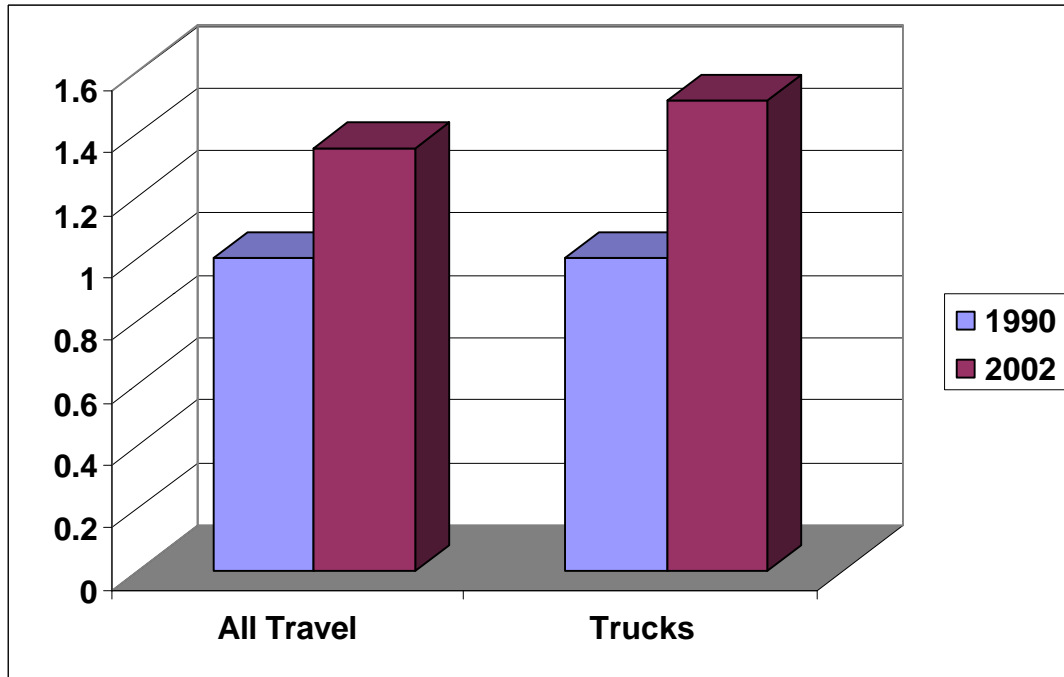
Administration, (FHWA) which annually gathers data on the condition of the nation's major roads. These data are submitted annually to the FHWA by state departments of transportation. Although the data are gathered by the states, the urban roads and highways, for which condition data are provided in this report, may be maintained by state or local governments.

The report also looks at the current level of annual investment being made in maintaining urban roads and highways, the amount needed annually to keep urban roads and bridges in their current condition, and the amount needed annually to improve their condition. The study concludes with a series of recommendations for improving the condition of the nation's urban and suburban roads.

Travel on Urban Roads

One simple measure of the nation's economic growth is the tremendous volume of cars, trucks and buses that take to our streets on a daily basis as the nation's growing population conducts their daily lives. And while this growing traffic is a reflection of increased population and economic growth, it has resulted in a significant increase in wear and tear on our urban roads. This is particularly true because urban travel by large commercial trucks increased by 51 percent from 1990 to 2002.¹ Overall urban vehicle travel increased by 35 percent from 1990 to 2002.²

Chart 1. The Increase in urban travel by all vehicles and by large commercial trucks from 1990 to 2002 (1 = 100 percent of 1990 total)



Source: TRIP analysis of FHWA data

Wear and tear on urban roads is expected to continue to increase at a substantial rate, making it even more difficult to keep urban roads in good condition in the future. Overall vehicle travel is expected to increase by approximately 42 percent by the year 2020 and the level of heavy truck travel nationally is anticipated to increase by approximately 49 percent by the year 2020, according to FHWA projections.³

Why Roads Deteriorate

Most drivers first notice that a road is deteriorating when they are jarred by driving over a surface that is rutted or uneven or the pavement has cracked and a pothole

has formed. But these visible signs of pavement distress are usually the final event in a process of deterioration.

Pavement failure can be caused by a combination of traffic loads and moisture. Moisture from rain or snow often works its way into road surfaces and the materials that form the road's foundation. Heavy traffic, particularly from heavier vehicles, puts stress on the road surface, increasing the likelihood that cracks or potholes may form. This process is enhanced during periods of freezing and thawing, which peak in the late-winter and early spring, which increases the likelihood of pavement failure. Road surfaces at intersections are even more prone to deterioration because the slow-moving or frequently stopping and starting traffic, particularly of heavy vehicles, occur at these sites, subjecting the pavement to higher levels of stress.

Metropolitan Pavement Conditions

Every year the FHWA gathers data on the condition of the nation's major roads. This includes condition data for roads that are maintained by federal, state or local governments. For this report, TRIP included condition data for all urban arterial routes, which include all Interstates and limited-access freeways, as well as other major city streets and routes within an urban area. Most routes that have at least four-lanes are arterial routes, although some key two-lane roads are also classified as arterial routes. Urban pavement conditions were rated by states mostly using the International Roughness Index (IRI), although some roads were also rated by the Present Serviceability Rating (PSR). While there may be some variance in how transportation officials apply

these indices, the FHWA data are the only national source of pavement condition ratings based on a consistent criteria.

TRIP then breaks down the condition of a region’s roads and highways into poor, mediocre, fair or good condition. The FHWA has found that that a road surface with an IRI below 95 provides a good ride quality, a road with an IRI from 95 to 170 provides an acceptable ride quality and that a road with an IRI above 170 provides an unacceptable ride quality.⁴ The FHWA finding is based on a study that measured driver reactions to various road conditions to determine what level of road roughness was unacceptable to most drivers.⁵ The actual scale used to rate the condition of the road and highway pavements are indicated in the following chart.

Chart 2. Pavement conditions, based on IRI or PSR rating.

	IRI	PSR
Poor	Above 170	2.5 or less
Mediocre	120-170	2.6 – 3.0
Fair	95-119	3.1 – 3.4
Good	0-94	3.5 or higher

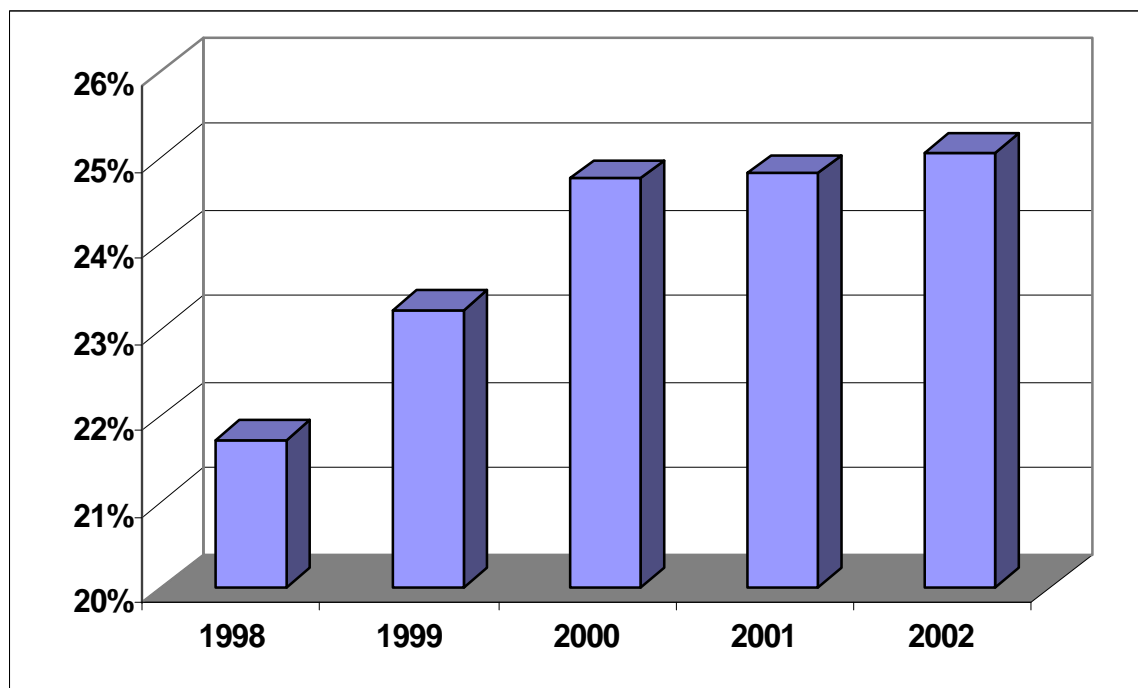
Source: TRIP, based on FHWA data

An analysis of the 2002 pavement data, which is the latest pavement data available, found that 25 percent of the nation’s major urban roads – interstates, freeways and other major routes – have pavements that are in poor condition. These are roads and highways that provide an unacceptable ride and are in need of resurfacing or more significant repairs. TRIP's analysis of federal highway data also found that 43 percent of

these major urban routes provided an acceptable ride quality and were in either mediocre or fair condition. The remaining 32 percent of major urban highways and roads were found to provide good ride quality.

TRIP also analyzed FHWA urban pavement data for the last five years to determine trends in urban pavement conditions. An analysis of this data indicates that urban pavement conditions have deteriorated in each year since 1998, with the percentage of major urban roads and highways with pavements that are in poor condition increasing from 22 percent in 1998 to 25 percent in 2002.⁶ Similarly, the percentage of the nation's major urban roads and highways with pavements in good condition decreased from 36 percent in 1998 to 32 percent in 2002.⁷

Chart 3. Percentage of major urban roads and highways with pavements in poor condition, 1998 to 2002.



Source: TRIP analysis of Federal Highway Administration data

The FHWA data allowed TRIP to determine how many miles of major roads in each urban area have pavements in poor, mediocre, fair or good condition. Drivers on roads rated as poor are likely to notice that they are driving on a rougher surface, which puts more stress on their vehicles. Roads rated as poor may have cracked or broken pavements. These roads often show significant signs of pavement wear and deterioration and may also have significant distress in their underlying foundation. Road or highway surfaces rated poor are in need of resurfacing and some need to be reconstructed to correct problems in the underlying road deck. Roads rated as being in either mediocre or fair condition may also show some signs of deterioration and may be noticeably inferior to those of new pavements, but can still be improved to good condition, with cost-effective resurfacing or other surface treatments, which will extend the roads' service life.

A desirable goal for state and local agencies that are responsible for road maintenance is to keep 75 percent of their major roads in good condition.⁸ But only three of the nation's largest urban areas - Atlanta, Orlando and Jacksonville - achieve this goal.⁹

Although road deterioration is often accelerated by freeze-thaw cycles found most often in the nation's northern states, the urban areas with the highest share of poor pavement conditions in the nation actually include urban areas from a variety of regions. The 10 major urban areas with the highest percentage of major streets and highways in poor condition are Los Angeles, San Jose, San Francisco-Oakland, San Diego, New Orleans, Boston, Sacramento, Riverside-San Bernardino, Tulsa and Philadelphia.¹⁰

Chart 4. Urban areas (population one million or more) with highest share of major roads and highways with pavements providing an unacceptable ride quality

URBAN AREA	PERCENTAGE UNACCEPTABLE
Los Angeles	66
San Jose	65
San Francisco-Oakland	61
San Diego	60
New Orleans	56
Boston	54
Sacramento	50
Riverside-San Bernardino	42
Tulsa	41
Philadelphia	40

Source: TRIP analysis of Federal Highway Administration data

A listing of each urban area’s road conditions and additional vehicle operating costs per driver can be found in appendices A and B for areas of at least 500,000, and in appendices C and D for regions with populations between 250,000 and 500,000.

The Cost to Motorists of Deteriorated Roads

When road surfaces deteriorate they tax motorists in the form of additional operating costs, which are incurred by driving on roads that provide a poor ride quality. Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. DOT, and in more than 100 other countries, as the definitive analysis of the impact of road conditions on vehicle

operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.¹¹

TRIP's additional vehicle operating cost estimate is based on taking the average number of miles driven annually by a region's driver, calculating current vehicle operating costs based on the AAA's 2003 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs being paid by drivers as a result of substandard roads.¹² Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into the TRIP methodology.¹³

TRIP estimates that driving on roads in need of repair costs the average urban driver \$400 annually in extra vehicle operating costs.¹⁴ A driver's individual additional vehicle operating costs may vary. Individual driver operating costs may be somewhat higher or lower depending on the type of vehicle driven, as larger vehicles tend to have greater increases in operating costs due to substandard roads, and the amount of travel by an individual driver.

Los Angeles area drivers incur the greatest annual extra vehicle operating costs due to driving on rough roads. The other urban regions where drivers pay the most

because of rough roads are San Jose, San Francisco-Oakland, San Diego, Sacramento, New Orleans, Tulsa, Oklahoma City, Riverside-San Bernardino and Albuquerque.

Chart 5. Urban Areas (population of one million or more) with highest annual additional vehicle operating cost per motorists as result of driving on roads with unacceptable ride quality

URBAN AREA	ADDITIONAL VEHICLE OPERATING COSTS PER DRIVER
Los Angeles	\$705
San Jose	\$704
San Francisco-Oakland	\$681
San Diego	\$674
Sacramento	\$622
New Orleans	\$621
Tulsa	\$610
Oklahoma City	\$586
Riverside-San Bernardino	\$571
Albuquerque	\$551

Source: TRIP analysis based on Federal Highway Administration data

Strategies for Smooth Roads

Improving the smoothness of the nation’s highways and roads is a key priority for transportation agencies. Significant progress has been made over the last decade in pavement materials, the design of roadway surfaces and in the maintenance of pavements.

Increasingly, state and local transportation agencies are using improved pavement materials and construction practices to increase the long-term durability of pavements.

Transportation agencies also are putting more emphasis on providing earlier maintenance of pavement surfaces to extend their service life and delay the need for costly and traffic delaying reconstruction. While these techniques result in a higher initial cost, it is likely that this approach to pavement management will result in smoother pavements and lower long-term costs.

Since the late 1980s, significant research has gone into developing pavement materials and construction practices that will provide a road surface that is more durable and can better withstand various climates and traffic loads. A variety of pavement designs and materials since then have been developed that can be tailored to the individual requirements of various sections of roads and highways, including high performance concrete pavements and Superpave hot mix asphalt pavements. Some pavement designs now call for thicker bottom layers, which resist bottom-up cracking and provide a sturdier base for the top layer of pavement, which can be resurfaced periodically.

Increasingly, states are specifying new pavement designs and materials to achieve more durable road surfaces. By 2002, 60 percent of all state-funded highway resurfacing or construction projects required the use of improved pavement materials and designs.¹⁵ The number of state highway projects using improved pavement mixes and designs tripled from 1998 to 2002.¹⁶ Local governments, which maintain many critical local roads and highways, still lag behind state governments in the use of improved pavement materials and designs, with only approximately 10 percent of local government road and highway projects requiring improved pavement materials and designs.¹⁷

A solid, stable and consistent foundation below the surface of a road or highway is critical in maintaining a smooth driving surface.¹⁸ When constructing or reconstructing a roadway, it is critical that the pavement's sub-base be adequate to support the roadway surface that cars and trucks will be driving upon. If a roadway's foundation is deficient, it will reduce pavement smoothness and increase the rate of pavement deterioration.

It is also critical that roadway surfaces be built or rebuilt initially as smooth as possible. A recent Federal Highway Administration report concluded "All other things being equal, the smoother a pavement is built, the smoother it will stay over time. The smoother it stays over time, the longer it will serve the traveling public, thereby benefiting the public in terms of investment and vehicular wear costs, as well as comfort and safety."¹⁹

Once a smooth, new pavement has been built, some transportation agencies are putting greater emphasis on doing early preventative maintenance on these pavements, to extend the lifespan of roadway surfaces and to delay the need for more significant pavement rehabilitation. These initial surface treatments include sealing a road surface to prevent moisture from entering cracks in the pavement, or thin pavement overlays, which improve ride quality, correct small surface irregularities and improve surface drainage and friction. For pavement preservation strategies to be effective, they must be applied while the pavement surface is still in good condition, with no apparent deterioration.

The timing of the maintenance and rehabilitation of road surfaces is critical, affecting the cost-effectiveness of the repairs and ultimately the overall quality of a regional road network. It is estimated that a preventive maintenance program can reduce the life-cycle costs of a pavement surface by about one-third over a 25-year

period.²⁰ The preventive maintenance approach may require several applications of minor sealing or resurfacing to a pavement surface over its lifetime, but reduces costs by delaying the need for more costly reconstruction.

The Best Way to Repair Potholes

When a road or highway deteriorates to the point where potholes form, care should be taken to insure that the repair will last as long as possible, which will delay the need to again divert traffic while the road is repaired. Some pothole repairs quickly show signs of cracking or fail completely, creating the need for repeated repairs, causing continued traffic delays.

The FHWA recently completed a study of a variety of pothole repair techniques to determine the best practice. The study was based on assessing 1,250 pothole patches at eight locations under varying weather conditions over a four-year period. The study found that 56 percent of the repairs were still functioning by the end of the study period.²¹ The report also found that the most critical issue in pothole repair is the quality of the materials used to fill in the pothole. "The cost of patching the same potholes over and over because of poor-quality patching material quickly offsets any savings from the purchases of less expensive mix," the FHWA report concluded.²² Higher grades of pothole patching material typically have aggregate mixes that are less susceptible to moisture damage and are more durable. More durable pothole patching materials are more expensive than other patching materials.

Other key variables impacting the effectiveness of pothole repair include adequate compaction of pothole fill material following the repair, the preparation of the site for repair by removing loose material and underlying moisture and the subsequent levels of precipitation at the location and the amount of and vehicle mix of traffic on the road.

Motorists Want Roads in Better Shape and Longer-Lasting Repairs

The increased use of more durable, long-lasting pavement materials and the adoption of pavement preservation techniques to prolong pavement service life is consistent with a recent public opinion poll which found that motorists want smoother pavements and fewer travel delays caused by work zones.

A poll taken in 2000 by the Federal Highway Administration found that 37 percent of people were dissatisfied with current pavement conditions. The poll, taken of more than 2,000 people, also found that 67 percent favored the use of more durable pavements; 66 percent wanted roads fixed during non-rush hours and 52 percent wanted highways and streets repaired in less time.²³

Funding Level Required to Improve Urban Road Smoothness

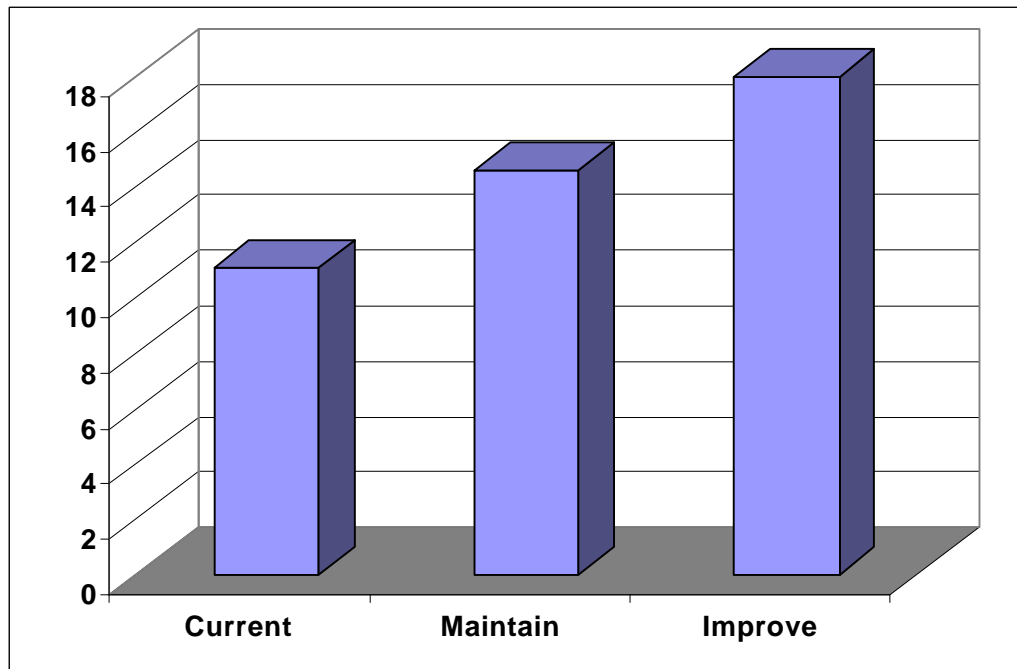
The U.S. Congress requires the U.S. Department of Transportation to provide semi-annually a comprehensive report on the condition, use and funding needs of the nation's surface transportation program. The most recent report, the 2002 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, found that

current levels of investment by all levels of government in maintaining the physical condition of urban roads is inadequate.

The DOT report estimated the current level of investment in preserving urban roads and highways and calculated what level of annual investment would be required through 2020 to either maintain physical conditions at their current level or to improve physical conditions.

The DOT study found that all levels of government are spending \$11.1 billion annually in preserving the physical condition of urban arterial and collector roads and highways, which includes all Interstates, freeways and major roads.²⁴ The DOT estimates that the annual investment needed to maintain urban arterial and collector roads and highways in their current condition is \$14.6 billion annually, and that the needed annual investment in urban arterial and collector roads and highways to improve conditions is \$18 billion annually.²⁵ An annual investment of \$18 billion, adjusted in future years to account for inflation, would allow all economically justifiable improvements to be done by 2020 to improve the physical condition of urban roads and highways, including providing future repairs that become necessary because of future deterioration.²⁶

Chart 6. Current annual funding, needed funding to maintain conditions and needed funding to improve conditions of urban roads, highways and bridges



Source: 2002 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, U.S. Department of Transportation

Thus, at the current level of investment in urban roads, overall pavement conditions can be expected to get worse, unless funding is increased, based on the findings of the 2002 U.S. DOT report to Congress. Keeping urban roadway conditions in their current condition would require a 32 percent increase in funding and making progress in improving the physical condition of urban roadways would require a 62 percent increase in funding, the 2002 U.S. DOT report found.²⁷

National Funding for Road and Bridge Improvements

Transportation agencies have developed pavement materials and designs as well as improved maintenance procedures that will result in smoother pavements. But making improvements in pavement conditions will require an increased level of investment.

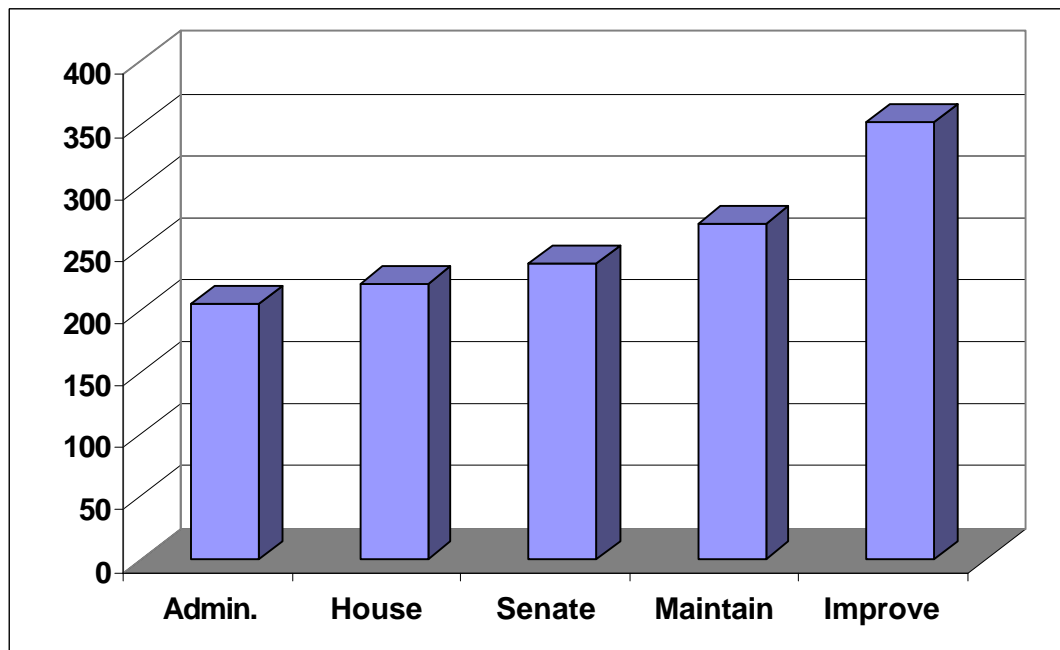
Unfortunately, the overall level of investment in road and bridge improvements has decreased significantly over the last two years, likely as a result of state and local budget cuts. McGraw-Hill found that state and local government contracts for road and bridge improvements during the 8-month period of July 2003 through February 2004 was down 18 percent from the same period two years prior.²⁸

The federal government is a significant source of funding for urban road and highway improvement projects. Federal funding for road and highway improvements is distributed to state and local governments under the provisions of the Transportation Equity Act for the 21st Century (TEA-21), which expires on April 30, 2004.

Both the House and Senate have approved proposals for a new six-year federal surface transportation program to succeed TEA-21. The Bush Administration has also proposed a new federal surface transportation program. Currently, members of the House and Senate are set to begin a conference to reconcile differences in their two proposals, which would then need to be passed by both legislative bodies and then signed into law by the President. The Administration has proposed a six-year surface transportation bill, which would provide \$207 billion over six years for highways (out of total surface transportation funding of \$256 billion).²⁹ The House of Representatives has approved a new federal surface transportation program that would provide \$222 billion for highways

over six years (out of a total program of \$275 billion) and the Senate has approved a program that would provide \$238 billion for highways over six years (out of a total program of \$318 billion).³⁰ Each of these proposals fall far short of estimates made by the U.S. Department of Transportation of the federal level of highway investment needed over the next six years to maintain road and bridge conditions and traffic congestion levels at their current level and of the cost to make significant improvements in road and bridge conditions and traffic congestion levels. The U.S. Department of Transportation estimates that the U.S. federal government should spend \$272 billion over the next six years on highway improvements to maintain current conditions and would need to spend \$354 billion over the next six years to make significant progress in improving road and bridge conditions and relieving traffic congestion levels.³¹

Chart 7. Proposed road and bridge funding under new Federal surface transportation program (2004-2009) by the Administration, the House of Representatives and the Senate and the U.S. DOT estimate for needed federal road, highway and bridge funding to maintain or significantly improve current conditions and performance over the next six years



Source: FHWA

Recommendations for Smooth Urban Roads

Increasing the smoothness of urban roads, thus reducing the additional vehicle operating costs paid by motorists for driving on deteriorated roads, requires that transportation agencies pursue an aggressive program of constructing and reconstructing roads to high smoothness standards, conducting maintenance before roadways reach unacceptable condition and using the best practices for repairing damaged pavements.

TRIP offers the following recommendations for providing a smooth drive:

- ✓ When critical routes are constructed or reconstructed, consider using pavement materials and designs that will provide a longer-lasting surface.
- ✓ Resurface roads in a timely fashion using pavement material that is designed to be the most durable given local climate and the level and mix of traffic on the road.
- ✓ Implement and adequately fund a pavement preservation program that postpones the need for significant rehabilitation by performing initial maintenance on road surfaces while they are still in good condition.
- ✓ Maintain an aggressive pothole repair program that uses the best patching material available.
- ✓ Invest adequately to insure that 75 percent of local road surfaces are in good condition.

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Endnotes

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- ¹ Highway Statistics 1990, 2002, VM-2. Federal Highway Administration.
www.fhwa.dot.gov/policy/ohpi/hss/index.htm
- ² Ibid.
- ³ The VMT projection is based on an annual increase of 2.08 percent as forecast in the 2002 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, U.S. Department of Transportation. P. 9-10. The estimated increase in large commercial truck travel is based on the Freight Analysis Framework, developed by the U.S. Department of Transportation.
- ⁴ 2002 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, U.S. Department of Transportation. P. 3-6.
- ⁵ A Statistical Analysis of Factors Associated With Perceived Road Roughness by Drivers, K. Shafizadeh, University of Washington, F. Mannering, Purdue University, (2002).
- ⁶ TRIP analysis of 1998, 1999, 2000, 2001 and 2002 Highway Statistics, Federal Highway Administration, charts HM-63 and HM-64.
- ⁷ Ibid.
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