AMATS: The State of Our Region's Transportation Infrastructure

A Technical Memorandum

December 2013

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The State of Our Region's Transportation Infrastructure: By the Numbers

640	miles of major roadways eligible for resurfacing in the AMATS Region
12.1	the percentage of major roadways with pavement condition ratings of "Poor"
16.8	the percentage of Summit County major roads with a "Poor" condition rating
83.8	million dollars AMATS has programmed for resurfacing projects through 2017
984	vehicular bridges located throughout the AMATS region
71	number of AMATS region's vehicular bridges classified as "Structurally Deficient"
1/4	approximate proportion of AMATS bridges classified as "Functionally Obsolete"
70.6	million dollars invested in projects involving bridge work over the last three years
49	average age of the bridges within the AMATS region

Executive Summary

In the following report, AMATS will present data and provide analysis regarding the state of our regional transportation infrastructure. The report focuses on two specific aspects of transportation infrastructure: roadways and their respective pavement condition ratings (PCR), and the structural integrity ratings of the vehicular bridges located in the AMATS region. Roadways with PCRs of less than 80, and bridges classified by the Ohio Department of Transportation (ODOT) as “structurally deficient” are viewed as *not* in a state of good repair for the purposes of this report.

Roadways Summary

According to the latest available data, 49.5% of the major roadways in the AMATS region are in “good” condition – meaning, they have a PCR of 80 or higher. 38.4% have PCRs in the “acceptable” range (between 79 and 65) and 12.1% fall within the “poor” classification (PCRs of less than 65). Under the same PCR methodology, the region’s freeways fare considerably well, with nearly two-thirds falling within the “good” classification, and only 1.5% rated as “poor”. When compared to peer metropolitan areas throughout the state of Ohio, AMATS’ roadway infrastructure falls in the middle of the pack. However, AMATS roadways maintain the highest ratings of all Northeast Ohio metropolitan areas. $83.8 million in federal, state and local funds has been programmed for resurfacing projects in the *AMATS 2014-2017 Transportation Improvement Program* (TIP).

Bridges Summary

The AMATS region contains 984 vehicular bridges (railroad bridges and pedestrian-only bridges were not analyzed in this report), which are inspected on a regular basis. 24.4% of the bridges in the AMATS region have been classified as “functionally obsolete”, meaning they are structurally sound, yet do not meet current design standards in one or more areas (vertical clearance, lane width, etc.). Of greater concern are the 71 bridges classified as “structurally deficient”, meaning one or more of the bridge’s three primary components (deck, superstructure and/or substructure) has been rated “poor” or worse. Although these bridges are not in danger of imminent collapse, they will eventually require significant investment to be brought back to a state of good repair. The percentage of structurally deficient bridges in the AMATS area (7.2%) is significantly lower than the national average (12.0%) – a positive statistic given that the average age of a bridge in our region is 49 years old. $155 million in federal, state and local funds has been programmed for projects involving at least some bridge work over the next four years (most of which is dedicated to the I-76/77/Main/Broadway interchange project in Akron).

Purpose of this Report

Transportation officials are charged with keeping transportation infrastructure in a “state of good repair”. This term is somewhat subjective and may vary by location, but it essentially means maintaining the transportation network to levels deemed acceptable in regards to comfort and safety.

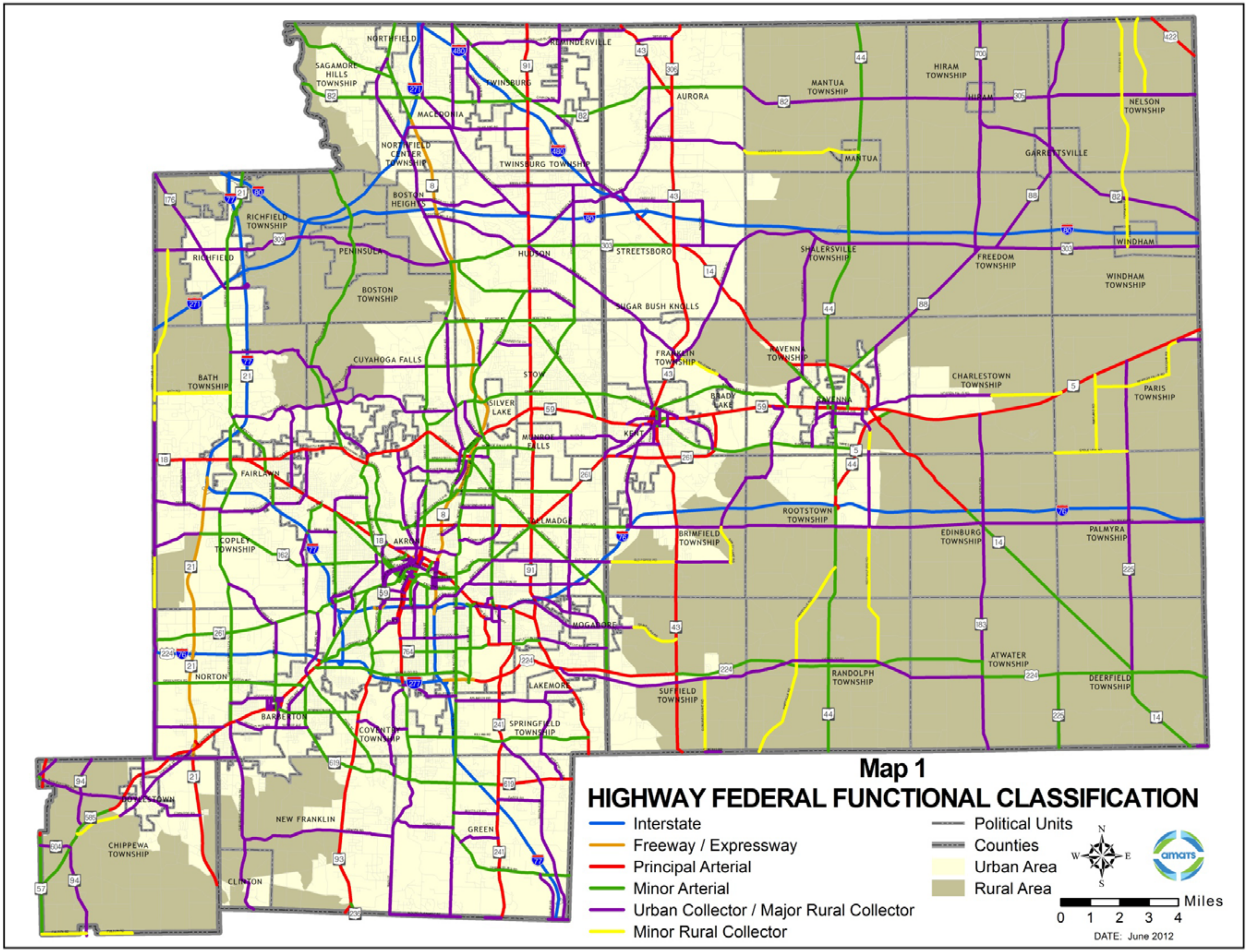
For the purposes of this report, “transportation infrastructure” refers to the federally classified roadways and all bridges within the AMATS region. Although AMATS publishes a number of reports, plans and technical memoranda which provide detailed information on the condition of individual transportation assets within the region, this report will provide a concise summary of the overall status of the region’s assets. Using this “snapshot” of our roadway and bridge infrastructure, citizens and public officials may quickly gain a general understanding of the region’s state-of-repair. A concise summary may also be useful to present to state and federal officials, who in turn may use the findings to argue the need for additional transportation funding for our region.

A secondary purpose of this report is that it provides baseline data by which we may benchmark the region’s transportation infrastructure going forward. Depending on improvement or decline in the future re-assessments of this data, we may evaluate the performance of the region’s transportation funding investments. This data may help with the prioritization of future projects and investments, as well as determining which types of projects are working well and which may need reconsideration.

Part I: Evaluating Our Roadways through Pavement Condition Ratings

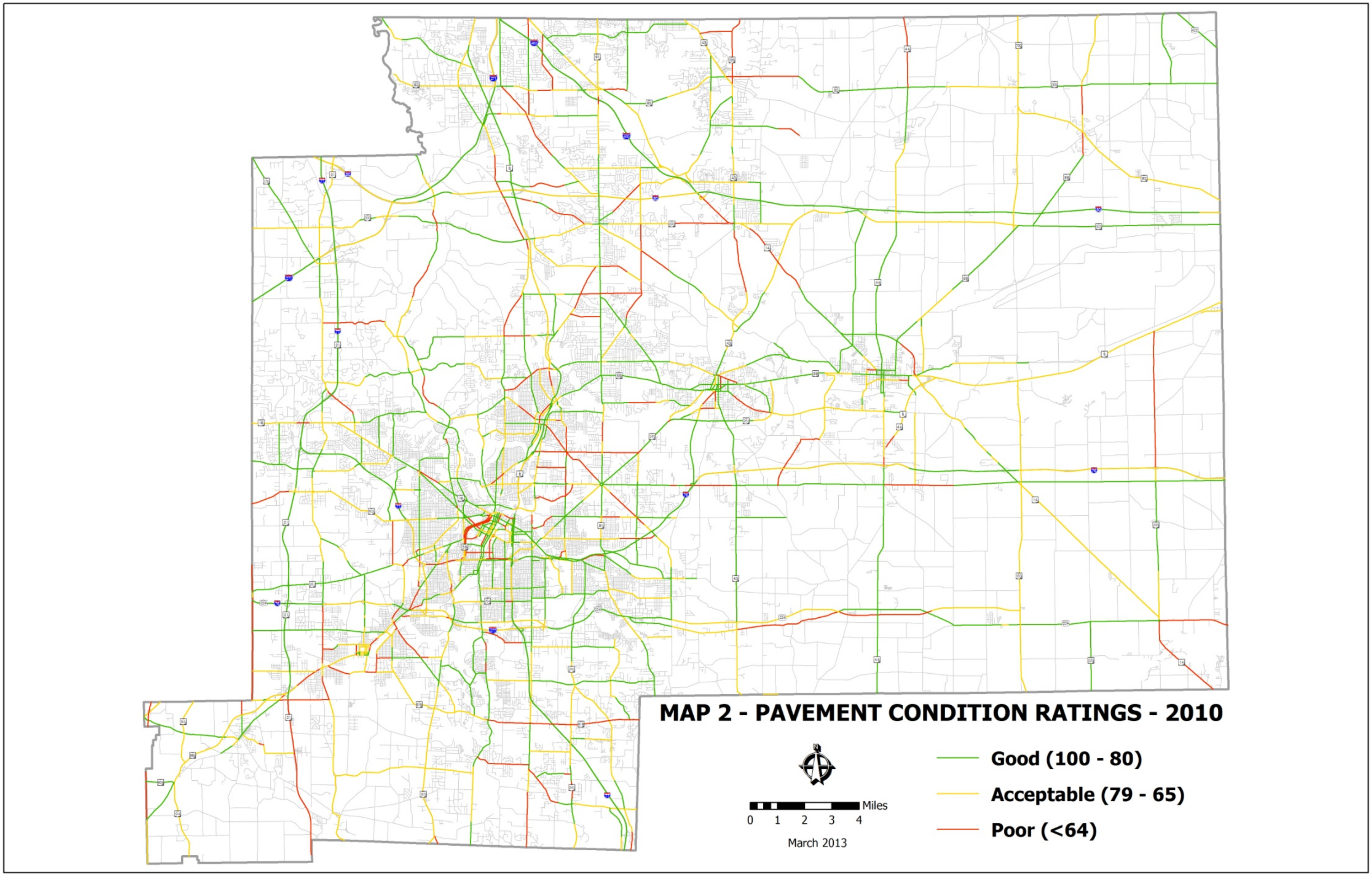
Everyday drivers and transportation officials agree that the smoothness of a road’s surface pavement is one of the best indicators of that road’s overall quality. Nothing beats the smooth ride of a freshly paved roadway, and likewise, few things earn the ire of motorists and cyclists like a rough, bumpy, pot-hole ridden roadway surface. States, counties and individual communities have developed various methodologies to rate the quality of roadway surfaces within their jurisdictions. These ratings are known as pavement condition ratings, or PCRs. The processes to gather this data, and the presentation of the final data, vary widely throughout the nation. Regardless of which system has been locally adopted, their common purpose is to help officials prioritize local transportation funding needs.

Until very recently in Ohio, the Ohio Department of Transportation (ODOT) was responsible for collecting PCR data for all interstate highways and federally classified roadways throughout the state. Cities would gather PCR data for their local residential and secondary streets using either their internal staff or through an external contractor. The County Engineer’s office would typically perform the same duties for townships and other unincorporated portions of the county. As the Akron region’s conduit for federal funding, AMATS’ focus has traditionally been on roadways eligible for federal-aid, which for the duration of this report we will refer to as “major” roadways. The map on the following page illustrates the federally classified, or “major”, roadways in the AMATS region.



Map 1

HIGHWAY FEDERAL FUNCTIONAL CLASSIFICATION



MAP 2 - PAVEMENT CONDITION RATINGS - 2010
Good (100 - 80)
Acceptable (79 - 65)
Poor (<64)
Miles
0 1 2 3 4
March 2013

Recently, as part of a cost-savings effort, ODOT has decided to cease collecting PCR data on roadways other than freeways and state routes. Metropolitan planning organizations (MPOs), such as AMATS, must facilitate this process for the remaining major roadways going forward. AMATS is currently working with its member communities to secure a vendor to gather PCR data for the entire region, not only picking up those that ODOT has discontinued, but (at the option of local communities) local streets as well. As a result of this collaborative shared-services project, the communities comprising the AMATS region may expect economies-of-scale savings of up to 50%. The details of this collaboration and potential contract are still being discussed, so the ultimate PCR methodology may or may not differ from the previously used ODOT system. Since those details are not finalized, this report will describe and is based on the traditional ODOT methodology.

The ODOT PCR Methodology

The ODOT pavement condition rating system is based upon a visual inspection of pavement surfaces. Each road segment begins the assessment with a presumed score of 100 (the equivalent of a newly paved roadway), and points are deducted based on the presence, frequency and severity of one of thirteen classifications of defects. Some defects (or "distresses") are deemed more severe than others, and are assigned a higher weighting – thus lowering the segment's PCR more significantly. Descriptions and visual examples of the thirteen classifications of pavement surface defects may be found in Appendix A, and are more fully described in ODOT's *Pavement Condition Rating Manual*:

(http://www.dot.state.oh.us/Divisions/Planning/TechServ/TIM/Documents/PCRManual/2006PCRManual.pdf)

The State of AMATS Roadways

Table 1: AMATS Pavement Condition Ratings

Major Roads and Freeways - 2010

Rating Category	Wayne Portion	Portage County	Summit County	AMATS Total
"Good" (PCR 80 or Higher)	49.2%	47.4%	50.7%	49.5%
"Acceptable" (PCR 79 - 65)	40.1%	41.3%	36.6%	38.4%
"Poor" (PCR < 65)	10.7%	11.3%	12.7%	12.1%

Source: ODOT

For the purposes of this report, AMATS has classified the roadways within our region into one of the three categories listed in the table above: "Good", "Acceptable" and "Poor". We realize that individual communities may have different standards as to what PCR level constitutes an acceptable roadway and what level warrants a resurfacing. At the regional level, these categories provide a good summary. According to the *AMATS Funding Policy Guidelines,* AMATS may only provide funding for roads with a PCR of 80 or less; roadways above this rating generally have very smooth pavement and allow for a comfortable ride. Likewise, the *AMATS Highway Preservation Needs Report* recommends that roadways with a PCR below 65 should consider a resurfacing or other rehabilitation. Roadways with PCRs falling between these two limits have surfaces that fall somewhere in-between.

As of 2010, nearly 50% of the freeways and major roadways within the AMATS region have pavement condition ratings of “Good”. Additionally, Summit and Portage Counties and the portion of Wayne County lying within the AMATS region maintain similar proportions of roadways within each rating category.

To rehabilitate all roadways with a rating of “Poor” would require the resurfacing of 146 miles of roadway throughout the region. To improve all “Acceptable” roadways would add an additional 462 miles of roadway, for a total of 608 miles requiring resurfacing funding.

Freeways/Interstate Analysis

Table 2: AMATS Interstate Highway PCRs

All ODOT Rated Interstate Highways - 2010

Rating Category	
"Good" (PCR 80 or Higher)	64.7%
"Acceptable" (PCR 79 - 65)	33.8%
"Poor" (PCR < 65)	1.5%

Source: ODOT

When isolating the freeway data, we discover that nearly two-thirds of ODOT rated freeways are rated as “Good”, and over 98% have an “Acceptable” rating or better. Only a very small proportion of the freeways in the AMATS region (which for this analysis includes I-76, I-77, I-80, I-271, I-277, I-480 and State Route 8) fall into the “Poor” category. One may argue that since interstate highways carry much greater traffic volumes, and at much higher speeds, it’s more imperative that roadway segments with an “Acceptable” rating are brought up to “Good” status as soon as possible. To bring our region’s interstate highways to “Good” status would require the resurfacing of 49 miles, or slightly more than one-third, of our region’s assets.

Please note: Although PCRs - or more generally, pavement smoothness - are used as the metric to judge the “state of good repair” for our region’s roadways in this report, there are other concerns beyond pavement condition. Many of our regional roadways (freeways in particular) exhibit capacity limitations, obsolete interchange geometries, aging sub-structures and other difficult and costly concerns, which are beyond the scope of this report. Please refer to the *AMATS Congestion Management Process* and the *Highway Preservation Needs* reports for complete details on these and related issues.

Peer Comparisons

It is difficult to truly understand the state of the region's roadway infrastructure without benchmarking it to the ratings of other areas. As previously mentioned, surrounding states use very different methodologies, which makes data comparison difficult to impossible. The best available "apples-to-apples" comparison is to use statewide data provided by ODOT. This data is provided at the county level, and does not include freeways.

Table 3: Comparison of Non-Freeway Roadways
By PCR Category

	"Good" PCR 80 or Higher	"Acceptable" PCR 79 - 65	"Poor" PCR < 65
Montgomery County - Dayton	67.2%	29.2%	3.6%
Franklin County - Columbus	66.1%	28.0%	5.9%
Lucas County - Toledo	59.7%	27.0%	13.3%
Hamilton County - Cincinnati	53.8%	33.4%	12.8%
Summit County - AMATS Major Roads	**48.8%**	**34.4%**	**16.8%**
Portage County - AMATS Major Roads	**46.5%**	**42.5%**	**11.0%**
Cuyahoga County - Cleveland	45.5%	28.5%	26.0%
Mahoning County - Youngstown	43.4%	20.4%	36.2%
Stark County - Canton	35.1%	38.6%	26.3%

Source: ODOT (2011 - 2012)

In the comparison data presented above, there are relatively few patterns that jump out at an observer. One might have expected that Franklin County, one of Ohio's most rapidly growing counties, to have among the highest proportions of "Good" roads in the state. However, Montgomery County's even larger proportion of "Good" roadways demonstrates that the quality of a county's roadways is not necessarily dependent on the county's rate of growth. The counties located entirely within the AMATS region – Summit and Portage – generally fall in the middle of these most populous Ohio counties in the "Good" and "Poor" categories. They are, however, at the head of the pack in the "Acceptable" category. When limiting our focus to Northeast Ohio counties (Cuyahoga, Mahoning, Portage, Stark and Summit), the counties comprising the AMATS region have the greatest proportion of "Good" roads and the lowest proportion of "Poor" roadways.

Roadways Conclusion

Keeping the AMATS region's roadways in a state of good repair is an ongoing process and requires careful planning and prioritization. The recently released *AMATS 2014-2017 Transportation Improvement Program* (TIP) lists 45 resurfacing projects which have been allocated approximately $83.8 million in federal, state and local transportation funds. Although this is a significant investment, we are mindful that for every roadway that is freshly resurfaced, all others continue their deterioration due to the traffic demands and extreme climatic conditions prevalent in Northeast Ohio.

Through regional collaboration, AMATS and its member communities will best leverage all available resources to ensure the continued maintenance of our roadway infrastructure. The upcoming PCR shared service agreement will provide the opportunity to increase consistency, comparability and efficiency of pavement condition data. Perhaps most importantly, it will establish a tangible example of how collaboration allows our region to accomplish more with its limited transportation resources than ever before.

Part II: Evaluating Our Bridges

Few things draw attention to the state of the nation's infrastructure like high-profile bridge collapses. The catastrophic collapse of the I-35 bridge in Minneapolis in 2007, and more recently, the 2013 Interstate 5 bridge collapse in Washington State, resulted in national headlines and left many drivers apprehensive when crossing bridges located in their own communities. As with most high-profile disasters, although these events draw enormous media attention, they are generally "freakish" in nature; the majority of America's bridges are perfectly safe, and even the worst are seldom to the point of imminent collapse. That being said, transportation officials do not take the issue lightly, and rigorous inspection programs have been established nationwide to prevent similar events from occurring.

In Ohio, all bridges greater than 20 feet in length receive annual routine inspections by the Ohio Department of Transportation's (ODOT) Office of Structural Engineering. More in-depth inspections, in which one or more of the three primary components of a bridge (Table 4) is inspected at a highly-detailed level, occur approximately every five years. If some form of damage has been documented on a particular bridge, inspections may occur more frequently, as ODOT deems warranted.

Table 4: Primary Bridge Components

Component	Description
Bridge Deck	The surface on which vehicles travel; Supported by the superstructure.
Superstructure	Transfers the load of the deck and bridge traffic to the substructure.
Substructure	Provides support for the entire bridge.

Source: Federal Highway Administration

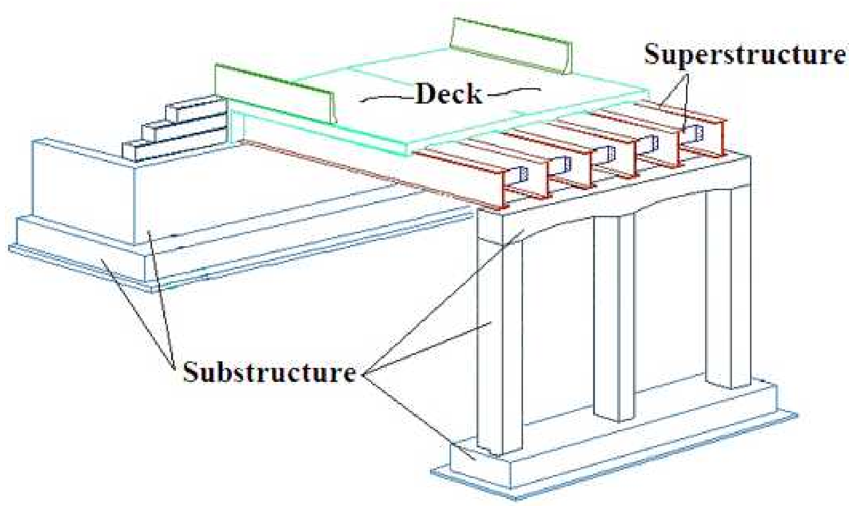


Illustration courtesy of the Michigan Department of Transportation

Unlike pavement condition ratings, which use a number of differing methodologies, bridge condition ratings are standardized across the nation. The Federal Highway Administration (FHWA) catalogs all American bridges (of 20 feet in length or greater) into the National Bridge Inventory (NBI) database, and has established universal standards and inspection procedures to be strictly adhered to and administered by the individual states. This allows for ease of comparison across the nation.

During an inspection, each component of a bridge is examined independently and given its own rating. However, all the components are also looked at holistically, and the bridge is given an overall appraisal rating.

Table 5: Bridge Condition Rating Categories

Rating	Condition Category	Description
9	Excellent	
8	Very Good	No problems noted
7	Good	Some minor problems
6	Satisfactory	Structural components show some minor deterioration
5	Fair	All primary structural components are sound but may have minor defects or deterioration
4	Poor	Advanced defects and/or deterioration
3	Serious	Defects and/or deterioration have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
2	Critical	Advanced deterioration of primary structural components. Cracks in steel or concrete may be present. Unless closely monitored, it may be necessary to close bridge until corrective actions are taken
1	Imminent Failure	Major deterioration present in critical structural components. Loss may be present in structural support, affecting bridge stability. Bridge is closed to traffic, but corrective action may be sufficient to put the bridge back into light service
0	Failed	Bridge is out of service and beyond corrective action

Source: FHWA

Bridge Classifications

If ample design discrepancies or structural deficiencies are discovered during the appraisal of a bridge, the bridge may be placed into one of two special classifications:

1) Functionally Obsolete – this classification is given to a bridge whose design does not meet current design standards. This classification has nothing to do with the structural integrity of a bridge. Rather, it typically applies to bridges built decades ago, according to a set of standards that do not conform to modern traffic or geometrical standards. Examples could include bridges with lanes that are deemed too narrow, low vertical clearances or unacceptable roadway alignments according to current design standards.

2) Structurally Deficient – a bridge receives this classification when one or more of its structural components is discovered to be in "Poor" or worse condition due to deterioration and/or damage. Assignment to this classification does *not* indicate that a bridge is unsafe to cross or is in danger of imminent collapse. Rather, it initiates a process of more regular and thorough inspections, where deterioration will be addressed and repaired as necessary. Often, a bridge may remain completely open or limited to light duty while corrective repairs are made. *Any bridge in danger of failure or collapse will be closed to traffic immediately until repairs or replacement allows it back into service.*

The State of AMATS Area Bridges

The AMATS region contains 984 vehicular bridges registered on the National Bridge Infrastructure database (bridges designed for pedestrian/bicycle use only have been excluded from this analysis). As mentioned, ODOT inspects these bridges and provides an overall appraisal rating for each one. The most recently available appraisal data for vehicular bridges in the AMATS region (as of 2010) is summarized in the following tables.

Table 6: Bridge Overall Appraisal Ratings

	Total AMATS Region		Summit County		Portage County		Wayne Portion	
Rating	# of Bridges	% of Bridges	# of Bridges	% of Bridges	# of Bridges	% of Bridges	# of Bridges	% of Bridges
9	126	12.8%	69	10.2%	36	15.5%	21	28.8%
8	240	24.4%	192	28.3%	39	16.8%	9	12.3%
7	219	22.3%	164	24.2%	42	18.1%	13	17.8%
6	253	25.7%	174	25.6%	57	24.6%	22	30.1%
5	79	8.0%	44	6.5%	31	13.4%	4	5.5%
4	52	5.3%	30	4.4%	19	8.2%	3	4.1%
3	14	1.4%	6	0.9%	7	3.0%	1	1.4%
2	1	0.1%	0	0.0%	1	0.4%	0	0.0%
1	0	0.0%	0	0.0%	0	0.0%	0	0.0%
0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	984		679		232		73	

Source: ODOT 2010 Data

Table 7: Functionally Obsolete Bridges ODOT 2010 Data		
Location	# of Bridges	% of Bridges
AMATS Region	240	24.4%
Summit County	176	25.9%
Portage County	46	19.8%
Wayne Portion	18	24.7%
U.S. (2009)		14.5%
Sources: ODOT; FHWA http://www.fhwa.dot.gov/policy/2010cpr/chap3.htm		

Table 8: Structurally Deficient Bridges ODOT 2010 Data		
Location	# of Bridges	% of Bridges
AMATS Region	71	7.2%
Summit County	36	5.3%
Portage County	31	13.4%
Wayne Portion	4	5.5%
U.S. (2009)		12.0%
Sources: ODOT; FHWA http://www.fhwa.dot.gov/policy/2010cpr/chap3.htm		

According to ODOT's most recent bridge inspection data, the AMATS region had 67 bridges with an overall appraisal rating of "Poor" or worse as of 2010. Portage County stands out as having the highest percentage of bridges rated "Poor" or worse, with approximately 12% of its bridges receiving this rating (as opposed to 5% in Summit and Wayne Counties).

On a positive note, the majority of vehicular bridges throughout the region fall within the upper realms of the overall appraisal rating spectrum. Approximately 85% of the AMATS region's bridges have an overall appraisal rating of "Satisfactory" or better. With that being said, extreme variables commonly affect our region (hot and cold weather extremes, heavy volumes of freight traffic, etc.), necessitating constant vigilance in the monitoring of our bridge infrastructure. State and local authorities must continuously invest in the inspection, repair and eventual replacement of our bridges, which are vital in a region of such diverse topography.

AMATS Area Bridge Investments

For the purposes of this report, AMATS will use a bridge's "structurally deficient" status to determine whether that bridge is in a state of good repair or not. Of the 71 structurally deficient bridges in the AMATS region, (detailed in Tables 9 and 10), eleven have already been (or are in the process of being) repaired or replaced. Over the last three years alone, $70.6 million in federal, state and local funds have been expended to repair or replace structurally deficient bridges throughout the region (Table 10). Seventeen more projects to repair or replace structurally deficient bridges have been programmed into the latest AMATS *Transportation Improvement Program* (TIP) through 2017, with a combined cost of $155 million (Table 9).

Based on data provided by ODOT, after deducting the bridges that have already been repaired or are have projects programmed into the TIP, 43 structurally deficient bridges remain throughout the AMATS region. Most of these remaining bridges have overall bridge appraisal ratings of "Poor" or lower. Also of concern is that it is difficult to tell how many bridges currently enjoy a "5" or "6" overall appraisal rating, yet are one inspection away from falling into the "Poor" category. Although difficult to estimate, the overall cost to bring our region's bridges into a state of good repair (i.e. elevating them all out of "structurally deficient" status) will be an expensive undertaking, requiring a large proportion of our limited future highway funding resources.

Table 9: Structurally Deficient Bridges in the AMATS Region							
Community	Overall Appraisal Rating	Bridge Location	Crosser Over	Year Built	Avg Daily Traffic	In TIP? (Fisc. Year)	TIP Project Cost ($000)
Akron	4	Swinehart Ave	Mud Run	1970	3,620	Yes (2014)	$ 600.0
Akron	3	State St (CR 644)	Ohio & Erie Canal	1923	2,360	Yes (2015)	$ 7,457.7
Akron	4	Main St (CR 50)	CSX RR (101)	1938	15,690	No	
Akron	4	N Main St (CR 16)	N Howard St NB Ramp	1947	14,110	No	
Akron	4	Bank St	Little Cuyahoga River	1933	11,580	Yes (2015)	$ 1,118.2
Akron	5	Harrington Rd (CR 227)	Tuscarawas Diversion Dam	1956	2,400	No	
Akron	4	North St (CR 632)	Little Cuyahoga River	1954	10,730	Yes (2014)	$ 1,474.2
Akron	4	Home Ave (CR 618)	Little Cuyahoga River	1954	7,930	No	
Akron	5	Manchester Rd (SR 93)	CSX & ABC RR	1960	10,530	No	
Akron	5	Brittain Rd (CR 34)	E Market St (SR 18)	1959	9,690	Yes (2015)	$ 2,048.1
Akron	7	I-76 WB/I-77 SB On-Ramp	S Main St (CR 50)	1963	2,300	Yes (2014)	$ 101,455.6
Akron	5	I-76/I-77	Brown St (CR 702)	1961	114,190	Yes (2015)	$ 23,783.6
Atwater Twp	3	Stroup Rd (CR 50)	Stream	1972	N/A	No	
Atwater Twp	6	Porter Rd (CR 54)	Branch of Mahoning River	1972	N/A	No	
Barberton	4	Coventry Rd	Mud Run	1929	N/A	No	
Bath Twp	5	Medina Line Rd (CR 2)	Branch of Yellow Creek	1928	2,130	No	
Boston Heights	4	Akron-Cleveland Rd	Bike & Hike Trail	1954	8,070	Yes (2014)	$ 4,718.5
Charlestown Twp	5	Esworthy Rd (TR 123)	Hinkley Creek	1940	N/A	No	
Charlestown Twp	4	Newton Falls Rd (CR 177)	Hinkley Creek	1948	600	No	
Chippewa Twp	3	Doylestown Rd (CR 70)	Mill Creek	1937	1,350	No	
Chippewa Twp	4	Galehouse Rd (TR 172)	Silver Creek	No Data	N/A	No	
Chippewa Twp	4	Edwards Rd (CR 206)	Silver Creek	1931	1,870	No	
Copley Twp	4	Wright Rd (CR 206)	Pigeon Creek	1974	1,150	No	
Deerfield Twp	4	Notman Rd (CR 68)	Willow Creek	1982	N/A	No	
Edinburg Twp	3	Industry Rd (CR 47)	Barrell Run	1971	740	No	
Edinburg Twp	4	Tallmadge Rd (CR 18)	Barrell Run	1938	2,500	No	
Franklin Twp	4	Johnson Rd (TR 141)	Fish Creek	1991	N/A	No	
Franklin Twp	4	Ravenna Rd (CR 145)	N-S RR	1983	1,420	No	
Garrettsville	4	Liberty St	Camp Creek	1950	N/A	No	
Garrettsville	4	Liberty St	Eagle Creek	1940	N/A	No	
Hiram Twp	4	Norton Rd (TR 280)	Silver Creek	1925	N/A	No	
Hudson	3	Ravenna Rd (CR 12)	Tinkers Creek	1932	2,660	Yes (2015)	$ 1,227.8
Hudson	4	Ingleside Dr	Brandywine Creek	1900	N/A	No	
Hudson	4	Blackberry Dr	Brandywine Creek	1900	N/A	Yes (2015)	$ 375.0
Hudson	4	Brandywine Rd (CR 40)	Brandywine Creek	1989	N/A	Yes (2015)	$ 375.0
Kent	3	Fred Fuller Park Dr	Cuyahoga River-Closed	1948	N/A	Yes (2014)	$ 1,165.2
Kent	6	Sunrise Blvd	Fish Creek	1968	N/A	No	
Kent	4	Allen Dr	Fish Creek	1974	N/A	No	
Mantua	4	Canada Rd	Cuyahoga Tributary	1940	N/A	No	
Mantua	3	High St	Cuyahoga River	1940	2,820	Yes (2016)	$ 1,391.0
Manuta	4	SR 44	Branch of Cuyahoga River	1935	7,550	Yes (2014)	$ 1,680.1
Manuta Twp	5	Mantua Center Rd (TR 247)	Black Brook Ditch	1948	1,260	No	
Milton Twp	4	Seville Rd (CR 60)	Chippewa Creek	1941	N/A	No	
Nelson Twp	4	Silica Sand Rd (CR 253)	Eagle Creek	1950	N/A	No	
Nelson Twp	4	Silica Sand Rd (CR 253)	Eagle Creek	1940	N/A	No	
New Franklin	4	Vanderhoof Rd (CR 215)	Tuscarawas River	1929	N/A	No	
Northfield Ctr Tw	6	Brandywine Rd (CR 40)	Brandywine Creek	1970	960	No	
Norton	3	Cleveland-Massillon Rd	Van Hyning Run	1925	7,060	No	
Norton	6	Summit Rd (CR 52)	I-76	1963	1,670	Yes (2014)	$ 3,745.1
Palmyra Twp	5	Whippoorwill Rd (TR 129)	Kale Creek Tributary	1973	N/A	No	
Palmyra Twp	4	Jones Rd (TR 136)	Kale Creek	1978	N/A	No	
Randolph Twp	4	Randolph Rd (CR 10)	Potter Creek	1975	700	No	
Randolph Twp	3	Johnnycake Rd (CR 72)	Feeder Canal Tributary	1940	N/A	Yes (2017)	$ 638.0
Richfield	5	Broadview Rd (SR 176)	I-271 (MP 2.75)	1970	6,030	No	
Richfield	4	Brecksville Rd (CR 17)	I-271	1968	7,530	No	
Rootstown Twp	4	Old Forge Rd (CR 82)	Breakneck Creek	1950	N/A	No	
Stow	4	Hudson Dr (CR 34)	Branch of Mud Brook	1938	8,440	No	
Twinsburg	4	Chamberlin Rd (CR 128) NB	N-S RR Spur	1956	5,680	No	
Twinsburg	8	Laurel Dr (Bridge Closed)	I-480	1965	N/A	No	
Twinsburg Twp	4	Ravenna Rd (CR 12)	Tinkers Creek	1917	9,550	Yes (2014)	$ 1,702.3
Total of Bridge Projects Programmed in FY 2014-2017 TIP:							$ 154,955.4

Source: ODOT

Table 10: S.D. Bridge Projects Underway or Completed Since 2010						
Community	Overall Appraisal Rating	Bridge Location	Crosser Over	Year Built	FY Year of Project	TIP Project Cost ($000)
Akron	3	Dart Ave	Ohio & Erie Canal	1979	2012	$ 805.0
Barberton	4	15th St	ABC RR	1925	2011	$ 1,751.0
Barberton	4	Cleveland-Massillon Rd	Hudson Run	1921	2012	$ 660.0
Charlestown Twp	3	Rock Spring Rd (CR 52)	West Branch Reservoir	1968	2012	$ 1,971.0
Kent	3	Main St (CR 500)	Cuyahoga River & CSX RR	1931	2012	$ 901.0
Nelson Twp	4	SR 88	Camp Creek	1948	2012	$ 2,015.0
Randolph Twp	4	US 224	Congress Lake Outlet	1957	2013	$ 6,021.0
Richfield Twp	4	I-271 NB ramp to I-77 NB	I-77	1969	2013	$ 55,332.2
Richfield Twp	4	I-271 SB	I-271 NB Ramp To I-77 NB	1971	2013	See Above
Richfield Twp	4	I-271 NB	I-271 NB Ramp to I-77 NB	1971	2013	See Above
Windham Twp	2	Parkman Rd (CR 299)	Eagle Creek	1967	2014	$ 1,128.0
Total of S.D. Bridge Projects Underway or Completed Since 2010:						$ 70,584.2

Source: ODOT

Comparison Data

As with roadway data, it is difficult to truly understand the state of our region’s bridge infrastructure without benchmarking it to other data. Since bridge ratings adhere to federally established standards, we may compare the AMATS region’s ratings to the entire American bridge population – the average of all 597,266 bridges cataloged in the National Bridge Inventory database.

Table 11: AMATS Bridge Appraisals vs. National Totals				
Overall Rating	Description	% AMATS Bridges	% National Total	Difference
9	Excellent	12.8%	1.7%	11.1%
8	Very Good	24.4%	13.7%	10.7%
7	Good	22.3%	26.4%	-4.1%
6	Satisfactory	25.7%	25.3%	0.4%
5	Fair	8.0%	16.3%	-8.3%
4	Poor	5.3%	9.6%	-4.3%
3	Serious	1.4%	2.3%	-0.9%
2	Critical	0.1%	4.0%	-3.9%
1	Imminent Failure	0.0%	0.0%	0.0%
0	Failed	0.0%	0.6%	-0.6%

Source: FHWA http://www.fhwa.dot.gov/policy/2010cpr/chap3.htm

In general, the overall appraisal ratings for bridges located throughout the AMATS region outperform those at the national level. AMATS bridge ratings heavily outweigh the national averages in the two highest categories, and maintain significantly fewer bridges in all “Poor-or-worse” rating categories. This is positive news for an older, low-growth metropolitan area located solidly within America’s “Rust Belt”.

This side-by-side comparison demonstrates the effectiveness of significant state and local investment in our region's bridge infrastructure.

A similar comparison can be made between the proportion of functionally obsolete and structurally deficient bridges located within the AMATS area and the national average.

Table 12: Comparison of Deficient Bridges

	AMATS %	National %	Difference
Functionally Obsolete	24.4%	14.5%	9.9%
Structurally Deficient	7.2%	12.0%	-4.8%

Source: ODOT 2010 Data; FHWA 2009 Data http://www.fhwa.dot.gov/policy/2010cpr/chap3.htm

As illustrated in Table 12, the AMATS region contains a much higher percentage of bridges classified as "Functionally Obsolete" than the national average. This outcome would not be entirely unexpected in an older, "Rust Belt" metropolitan area like greater Akron, which built the vast majority of its infrastructure long ago during its peak growth, industrial heyday, and according to engineering and vehicle standards that were determined to be adequate at the time. Today, however, these bridges no longer meet current safety, capacity and/or other design standards. This significant deviation from the national average means that there is plenty of work ahead of us to bring the vertical clearances, lane widths, roadway approach geometry and other standards up to modern day expectations.

In the more concerning of these two special bridge classifications, AMATS has far fewer bridges identified as "Structurally Deficient" than the National Bridge Inventory average. Although it is a positive development to know that AMATS' local infrastructure so greatly outperforms the nation in this regard, the fact that 7.2% of our bridges exhibit some form of deficiency in at least one of their three major components is still cause for concern. The limited financial resources available to our region restrict us from immediately addressing every structurally deficient bridge. However, the smaller proportion of these bridges in our region should help state and local authorities target the worst-of-the-worst and help establish realistic, fiscally-constrained priorities for bridge repairs and/or replacements.

Bridge Conclusion

Similar to maintaining the condition of our local roadways, ODOT, AMATS and local communities must continuously monitor the safety and structural integrity of the 984 vehicular bridges located within our region, and determine the best way to invest and leverage available resources to keep our bridge portfolio in a state of good repair. The AMATS region has a solid reputation of addressing problem bridges, as evidenced by the favorable proportions of our bridges exhibiting some form of deficiency when compared to national averages. $155 million in state, local and federal funds have been committed to projects involving bridge work over the next four years alone to continue this trend. Despite these investments, there are still many bridges in our region with various levels of deterioration. Continuous investment must be made to keep up with an ever-aging bridge infrastructure.

Report Conclusion

Keeping the roadways and bridges within the AMATS region in a state of good repair is an ongoing and costly process. Further complicating the effort is that all transportation infrastructure is in a constant state of deterioration, making data collection, analysis and the funding of key improvement projects an up-hill battle.

As an older, industrial metropolitan area, solidly located within America's "Rust Belt", greater Akron's roadway and bridge infrastructure is old and in need of repair. Although several million dollars have been invested in resurfacing and bridge projects throughout the years, and millions more have been dedicated for upcoming years, AMATS and its member communities face the realization that this is a region where the average bridge is 49 years old, and in which 12.1% of our federally classified roadway surfaces have "Poor" pavement condition ratings. When these considerable infrastructure needs - the needs of a *single* U.S. metropolitan area - are weighed against a funding source which is essentially bankrupt (the Federal Highway Trust Fund), it is not much of a stretch to say that the prospect of keeping our transportation infrastructure network in a state of good repair is a daunting one.

The plus-side of the aforementioned situation is that rather than blindly throwing money into any project that comes along, it forces us to carefully plan for our future, prioritize our needs and thoughtfully allocate our limited transportation funding resources. This approach is demonstrated in AMATS' recently adopted "fix-it-first" policy – that maintaining the infrastructure we already have takes priority to the construction and expansion of new infrastructure, except in the most pressing circumstances. In this regard, the slow growth of our region's population and vehicle miles traveled has helped reinforce our "fix-it-first" policy, since infrastructure expansion is not as warranted as in more rapidly-growing regions.

AMATS will continue to collaborate with its partners to keep abreast of the state of our local transportation infrastructure, and through good planning efforts and targeted investments, will utilize the Transportation Improvement Program to most effectively meet the region's infrastructure priorities using all of the resources available to us.

Appendix A: Pavement Defects/Deficiencies

The following images illustrate the thirteen classifications of pavement defects/deficiencies identified by the ODOT pavement condition rating methodology. As mentioned in the preceding report, some defects are considered more problematic than others, and thus receive a higher distress weight in the ODOT methodology. The presence of these more highly-weighted defects will decrease a roadway's PCR rating more significantly.

Raveling – Disintegration of the pavement surface in a downward manner, due to a loss of pavement particles. *Distress weight = 10*.

Image courtesy of www.pavemanpro.com

Bleeding – A shiny, black roadway surface caused by liquid asphalt binder rising to the pavement surface. Can result in a loss of texture on the roadway surface. *Distress weight = 5*.

Image courtesy of www.roadscience.net

Patching – Placing asphalt on the surface of existing pavement to repair a defect, or used to replace an existing, defective section of pavement. *Distress weight = 5*.

Image courtesy of pressdemocrat.com

Image courtesy of www.grandrapids.govoffice.com

Debonding – The removal of a portion of the surface layer from an underlying layer of pavement. Applies particularly to thin pavement layers, and is often caused by freeze-thaw patterns. *Distress weight = 5*.

Image courtesy of ODOT

Crack Sealing Deficiency – The deterioration of sealant used to repair previous cracks in pavement. Sealant is used to prevent precipitation from entering pavement cracks. It deteriorates over time and is rendered ineffective. *Distress weight = 5*.

Image courtesy of ODOT

Rutting – Depressions, tracks, or grooves in the pavement surface where vehicle wheels typically run. *Distress weight = 10*.

Image courtesy of www.pavementinteractive.org

Settlement – A dip in the pavement surface of a roadway. *Distress weight = 0*.

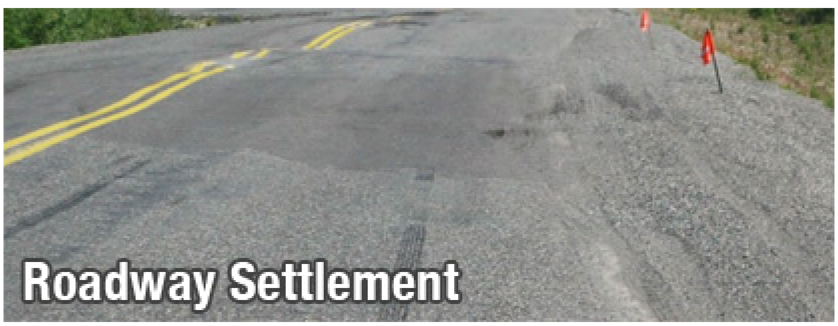


Image courtesy of drivingstrategicsales.com

Potholes – Bowl-shaped holes or depressions in the pavement surface. These are manifestations of weaknesses in the base layers of the roadway. *Distress weight = 10*.

Image courtesy of www.pavemanpro.com

Wheel Track Cracking – Cracks located within the tracks of the roadway where wheels typically run. *Distress weight = 15*.

Image courtesy of ODOT

Block & Transverse Cracking – Interconnected cracks which divide pavement into large square or rectangular blocks. *Distress weight = 10*.

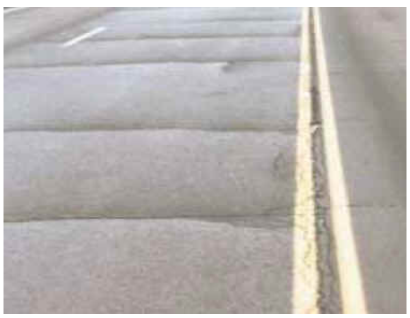


Image courtesy of TN Dept of Transportation

Longitudinal Cracking – Cracks formed parallel to the centerline of the roadway, typically resulting from joints in the underlying surfaces of the roadway that reflect up through the upper layers of the roadway. *Distress weight = 5*.

Image courtesy of asphaltinstitute.org

Edge Cracking – Cracks found within one foot of the pavement edge line. *Distress weight = 10*.

Image courtesy of www.pavemanpro.com

Thermal Cracking – A series of evenly spaced cracks running perpendicular to the centerline of a roadway. Will run across the entire roadway surface, from edge to edge. Caused from repeated fluctuations in climate temperature. *Distress weight = 10*.

Image courtesy of www.pavementinteractive.org