SYSTEMS PERFORMANCE REPORT

Systems Performance Report

This document provides information on the current and proposed target information adopted by Michigan Department of Transportation (MDOT) for roads, highways and transit. Updates to target data will be on the KATS website.

Roads and Highways Reporting Requirements
MDOT is required to report to Federal Highway Administration (FHWA) on the establishment of state performance targets and the progress made in attaining the state targets on biennial basis (October 1 of each even numbered year). One exception to the biennial reporting requirements is for the safety performance measures, which are required to be reported by MDOT to FHWA through the Highway Safety Improvement Program Annual Report by August 31 of each year.

MPOs are not required to provide annual reports other than MPO decisions on targets. MPOs are required to report MPO performance targets to MDOT in accordance with the documented procedures. This will result in MPOs reporting MPO safety targets annually to MDOT, and other performance targets as they are established (every two or four years).

### 2023 Safety Targets – Road and Highways
Federal regulations require the use of five-year rolling averages for each of the performance measures which include Fatalities, Fatality Rate per 100 million VMT, Serious Injuries, Serious Injury rate per 100 million VMT, Non-Motorized Fatalities and Serious Injuries. The values used in creating the following charts for 2020 and 2021 estimates were provided by MDOT.

Total Fatalities & Fatalities Rate

How Targes Are Set
MDOT and Office of Highway Safety Planning used two different models to forecast the total fatalities and serious injuries for target setting. The fatality models developed my MDOT relied on the relationship between oil prices, the Dow Jones Industrial (DJI) futures and fatalities. The price of oil and the level and changes in the DJI futures are closely correlated to the travel demand and traffic crashes. The second model was developed and maintained by the University of Michigan Transportation Research Institute (UMTRI). The UMTRI model relies on results of a recently completed research report titled *Identification of Factors Contributing to the Decline of Traffic Fatalities in the United States.* The model relies on the correlation between traffic crashes and vehicle miles traveled (VMT), Gross Domestic Product (GDP) per capita, median annual income, and the unemployment rate among 16–24-year-olds.

To determine the forecasted five-year rolling average for Fatalities, Fatality Rate per 100 million VMT, Serious Injuries, and Serious Injury Rate per 100 million VMT, the forecast was obtained from the models for 2020 and 2021. The final forecasted value for fatalities is the average of MDOT and UMTRI forecasted values which predicts 886 in 2020 and 967 in 2021. The target for calendar year 2023 is 1105.6 for fatalities and 1.136 for fatality rate, which is show in the following charts.

Statewide Fatalities

Statewide Fatality Rate
Fatalities per 100 million Vehicle Miles Traveled
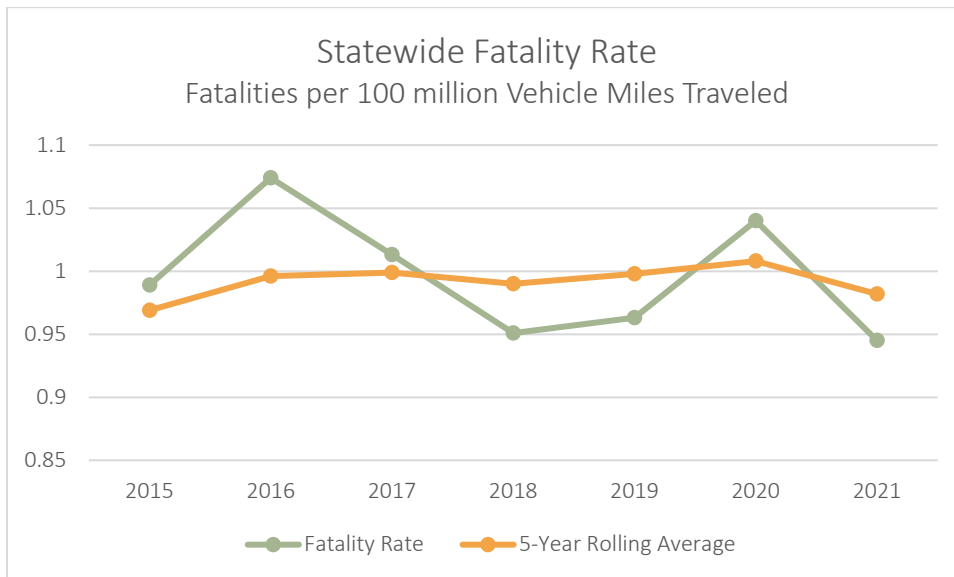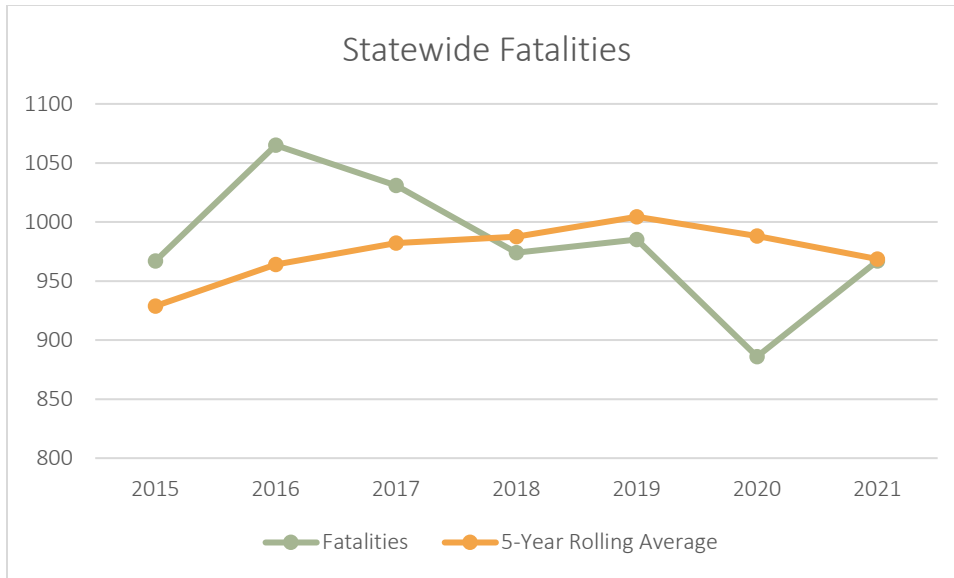
Reporting Requirements

MDOT is required to report to FHWA on the establishment of state performance targets and the progress made in attaining the state targets on a biennial basis (October 1st of each even numbered year). One exception to the biennial reporting requirement is for the safety performance measures, which are required to be reported by MDOT to FHWA through the Highway Safety Improvement Program Annual Report by August 31st of each year.

State Actions

- To meet the safety goal of reducing fatalities and serious injuries on the state trunkline system, the strategy of the Safety Program is to select cost-effective safety improvements, as identified in Michigan's Strategic Highway Safety Plan (SHSP), to address trunkline locations with correctable fatality and serious injury crashes.

- All proposed safety funded improvements must be supported by the MDOT Region's Toward Zero Deaths Implementation Plan to mitigate crashes within the area. Priority is given to those projects with SHSP focus area improvements that have the lowest cost/benefit analysis or are a proven low-cost safety improvement to address the correctable crash pattern.
- On the local road system, MDOT administers federal safety funds for safety improvements supported by a Local Road Safety Plan or addressed by means of a low-cost safety project. High Risk Rural Road is one program used to address rural roadways where fatalities and serious injuries exceed the statewide average for that class of roadway.

MPO Actions

- As shown in the table below, the Kalamazoo MPO supported the adoption of MDOT's State Targets for Safety Performance Measures for Calendar Year 2023. This established targets for five performance measures based on five-year rolling averages, including:
    - Number of Fatalities,
   - Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT).

Michigan State Safety Targets for Calendar Year 2023		
Safety Performance Measure	Baseline Condition	2023 Targets
Fatalities	1,041.8	1105.6
Fatality Rate	1.071	1.136

- Implement the recommended strategies based on the defined emphasis areas for the Kalamazoo MPO.
- Give priority in the Transportation Improvement Program (TIP) to projects that address safety.
- Encourage Act 51 Agencies to implement systemic treatments such as bale stay barriers and center rumble strips to reduce lane departure crashes.
- Use data to develop projects that address safety hazards in particular locations.
- Promote safe travel habits for drivers, transit riders, cyclists, and pedestrians through education and enforcement initiatives and programs.

Total Serious Injuries & Serious Injuries Rate

How Targets are Set

The UMTRI model was the sole model used in forecasting total serious injuries as it exhibited a strong linear relationship of the ratio of serious injuries and fatalities (A/K). The forecasting total for serious injuries is 4,960 in 2020 and 5,409 in 2021. The target for calendar year 2023 is 5,909.2 for serious injuries and 6.058 for serious injury rate.
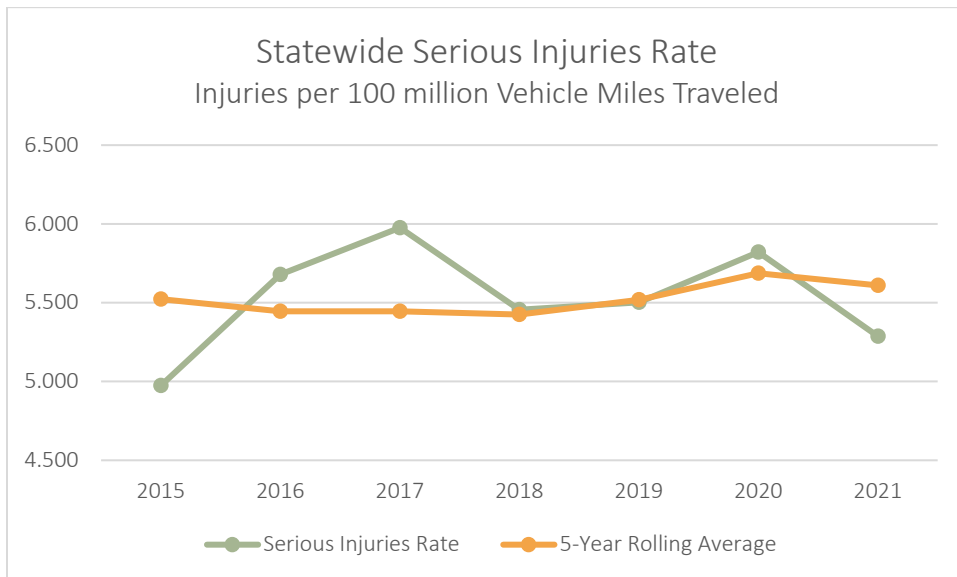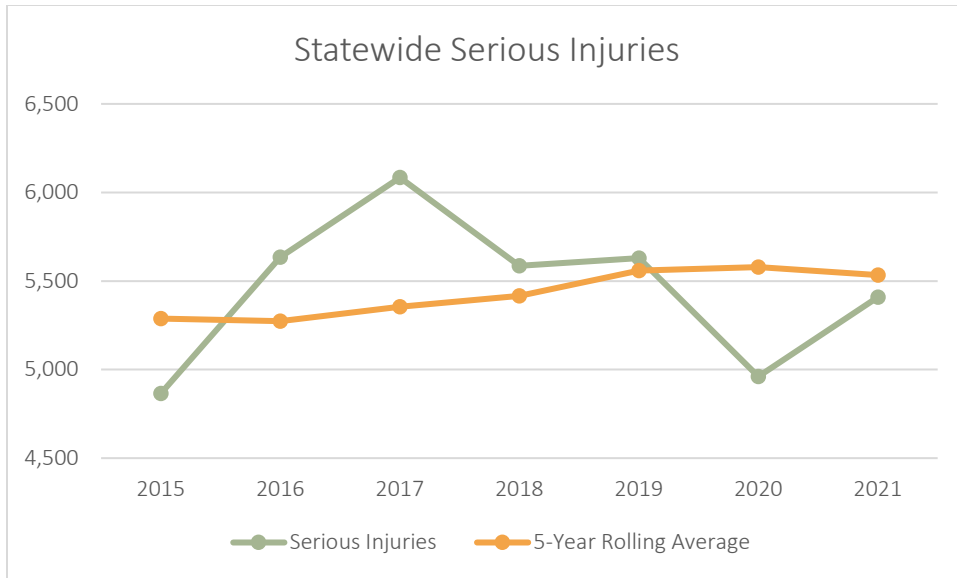
Statewide Serious Injuries

Statewide Serious Injuries Rate
Injuries per 100 million Vehicle Miles Traveled

State Actions

- To meet the safety goal of reducing fatalities and serious injuries on the state trunkline system, the strategy of the Safety Program is to select cost-effective safety improvements as identified in Michigan's SHSP to address trunkline locations with the correctable fatality and serious injury crashes.
- All proposed safety funded improvements must be support by the MDOT Region's Toward Zero Deaths Implementation Plan to mitigate crashes within the region. Priority is given to those projects within each Region, with SHSP focus area improvements that have the lowest cost/benefit analysis or are proven low-cost safety improvement to address the correctable crash pattern.
- On the local road system, MDOT administers federal safety funds for safety improvements supported by a Local Road Safety Plan or addressed by means of a low-cost safety project. High

Risk Rural Road is one program used to address rural roadways where fatalities and serious injuries exceed the statewide average for that class of roadway.

MPO Actions

- As shown in the table below, the Kalamazoo MPO supported the adoption of MDOT's State Targets for Safety Performance Measures for Calendar Year 2023. This established targets for fiver performance measures based on a five-year rolling average, including:
  - o Number of Serious Injuries.
 - o Rate of Serious Injuries per 100 million VMT.

Michigan State Safety Targets for Calendar Year 2023		
Safety Performance Measure	Baseline Condition	2023 Targets
Serious Injuries	5,742.2	5,909.2
Serious Injury Rate	5.878	6.058

- Implement the recommended strategies based on the defined emphasis areas for the Kalamazoo MPO.
- Give priority in the TIP to projects that address safety.
- Encourage Act 51 Agencies to implement systemic treatments, such as cable stay barriers and center rumble strips to reduce lane departure crashes.
- Use data to develop projects that address safety hazards in particular locations.
- Promote safe travel habits for drivers, transit, cyclists, and pedestrians through education and enforcement initiatives and programs.

Total Bicycle & Pedestrian Fatality and Serious Injuries

How Targets Were Set
Results from the UMTRI model (the A/K relationship) were also used to generate forecasted 5-year moving average values for bicycle and pedestrian fatalities and serious injuries for 2020 and 2021. The forecasting total for fatalities and serious injuries is 714 for 2020 and 799 in 2021. The target for calendar year in 2023 is 743.4 for fatalities and serious injuries.

Pedestrian & Bicycle
Fatalities and Serious Injuries
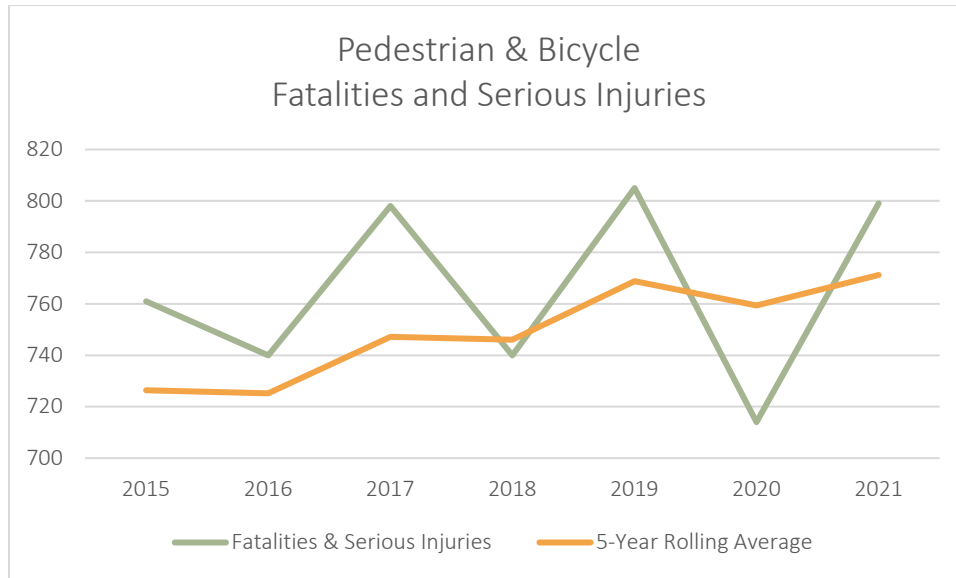
State Actions

- Implement the recommendations of the MDOT University Region Non-Motorized Plan.
- MDOT continues to work with researchers to improve pedestrian and bicycle safety. Examples of current or past work include the development of gateway treatments for pedestrian and Michigan bicycle and pedestrian travel modes.
- MDOT supports Wester Michigan University's participation in the Roadway Safety Institute as part of the Region 5 University Transportation Center aimed at high-risk road users.
- MDOT also participates with UMTRI in the development of a risk model for non-motorized users, and with Wayne State University in research to further side-path safety.

MPO Actions

- As shown in the table below, the Kalamazoo MPO supported the adoption of MDOT's State Targets for Safety Performance Measures for Calendar Year 2023. This established targets for five performance measures based on five-year rolling averages, including the number of non-motorized fatalities and serious injuries.

Michigan State Safety Targets for Calendar Year 2023		
Safety Performance Measure	Baseline	2023 Target
Non-Motorized Fatalities & Serous Injuries	752.0	743.4

- Address safety issues, concerns and needs for bicyclists and pedestrians in the Non-Motorized Element.
- Implement the recommendations in the Non-Motorized Element upon the plan's adoption.
- Focus safety funding on the high crash areas as identified in the KATS Pedestrian, Greenways and Transit Plan as well as the Non-Motorized Element.
- Utilization of MDOT road safety audits and engineering countermeasures and other initiatives, programs or designs that are promoted as part of the Toward Zero Deaths National Strategy.

Transit Reporting Requirements

The Federal Transit Administration Transit Asset Management Rule requires a group Transit Asset Management (TAM) plan to set one or more performance targets for each applicable performance measure. The goal is to establish a strategic ands systematic process of operation, maintaining, and improving public capital assets effectively through their entire life cycle. The targets should be based on realistic expectations, and the recent data available and the financial resources from all sources that area reasonably expected funding the TAM plan horizon period. The three asset classes to be in the Transit Asset Management plan are Revenue Vehicles, Service Vehicles, and Facilities.

Based on current asset conditions, investment prioritization, and planned capital projects, Michigan has established the following objectives:

- Maintain the average condition of facilities at a minimum rating of 3.5 on the TERM scale by the end of FY 2030.
- Maintain the rural vehicle fleet at a target of under 20% past their useful life benchmark.
- Annually, increase and maintain the percentage of assets with FTA condition ratings above 3 on the TERM scale.

The Michigan Department of Transportation along with the Federal Transit Administration, discussed the federal requirements and the targets for 2022.

2022 State of Michigan, State of Good Repair		
Measure	Current Condition	2022 Target
Rolling Stock		
Vans	16% past ULB	Not more than 10% will exceed ULB of 7 years
Cutaways	7% past ULB	Not more than 10% will exceed ULB of 10 years
Bus (Med-Duty)	16% past ULB	Not more than 15% will exceed ULB of 10 years
Bus (Med-Heavy Duty & Large)	5% past ULB	Note more than 15% will exceed ULB of 14 years
Service Vehicles	71% past ULB	50% may exceed ULB of 7 years
Facilities (all classes)	3% past ULB	Note more than 5% will exceed ULB (assessment rating less than 3)

*ULB – Useful Life Benchmark.

How Targets are Set

MDOT ran reports from Public Transportation Management System (PTMS), the reporting system for public transit agencies who receive federal funding. Targets were set based upon funds available to MDOT and the current conditions of revenue vehicles, service vehicles, and facilities. Targets are set for the rural area by MDOT on an annual basis each year in January and reported in the National Transit Database (NTD).

Urban Transit Targets

Transit agencies in an urban area are required to develop targets for State of Good Repair. The purpose of the State of Good Repair is to establish a strategic and systematic process of operation, maintaining and improving public capital assets effectively through their entire life cycle. Central County Transportation Authority (CCTA) has cooperatively developed a Public Transportation Agency Transportation Plan and has adopted safety targets for Calendar year 2021.

Mode of Transit Service	Fatalities (Total)	Fatalities (rate)	Injuries (Total)	Injuries (rate)	Safety Events (Total)	Safety Events (Rate)	System Reliability
Fixed Route	0.054/year Preventable Accidents 33/year	0.003/100k Vehicle Revenue Miles	6.9/year Driver Assaults 0.33/year	.394/100k Vehicle Revenue Miles	7.9/year Work Related Injuries 16	.451/100k Vehicle Revenue Miles	35,000 miles
Demand Response/ Paratransit	0.051/year Preventable Accidents 5/year	0.0029/100k Vehicle Revenue Miles	7.2/year Driver Assaults .02/year	.411/100k Vehicle Revenue Miles	7.5/year Work Related Injuries 5/year	.429/100k Vehicle Revenue Miles	170,000 miles

National Highway System Bridge Condition Targets

The Transportation Performance Measure regulatory requirements outlined in 23 CFR 490.105 and 23 CFR 490.107 regarding bridge condition targets, are based on a state adjusted 4-year National Highway System targets. The Kalamazoo Area Transportation Study recognized the importance of a safe transportation system and supports the cooperatively developed bridge targets from the Michigan Department of Transportation.

Performance Area	Measure	Baseline Condition (2022-2025)	2-Year Targets	4-Year Targets
Bridge	Percent of National Highway System (NHS) Deck Area in Good Condition	22.1%	15.2%	12.8%
	Percent of NHS Deck Area in Poor Condition	7.0%	6.8%	5.8%

KATS MPO 2022-2025 Bridge Conditions		
Deck Area in Good Condition	Deck Area in Fair Condition	Deck Area in Poor Condition
44%	45%	11%
234,944 square feet	238,508 square feet	57,426 square feet

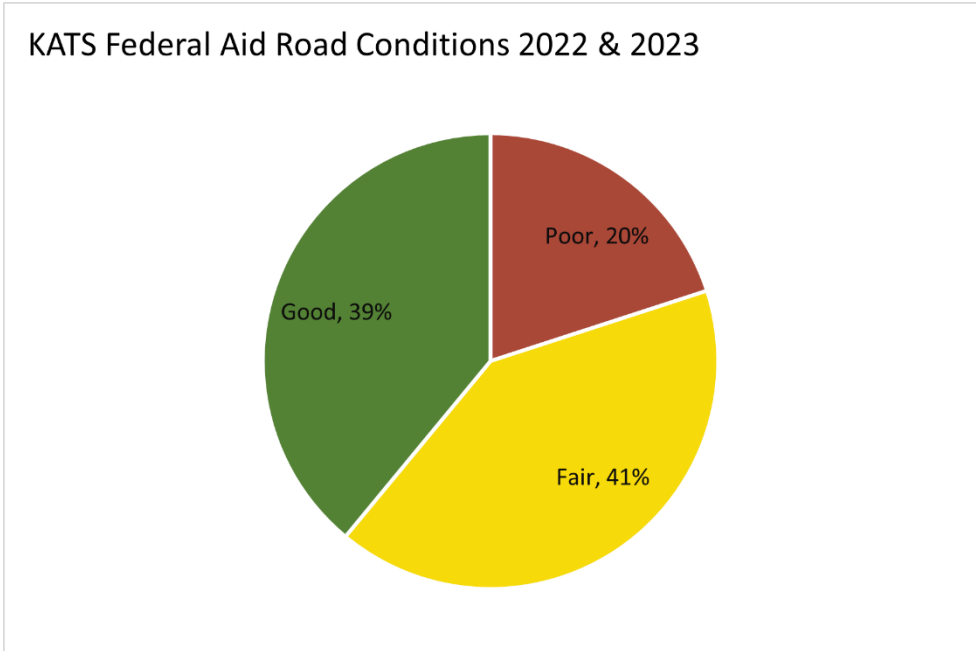*total bridge deck are in the KATS MPO is 530,878 square feet.

Pavement & Bridge Condition
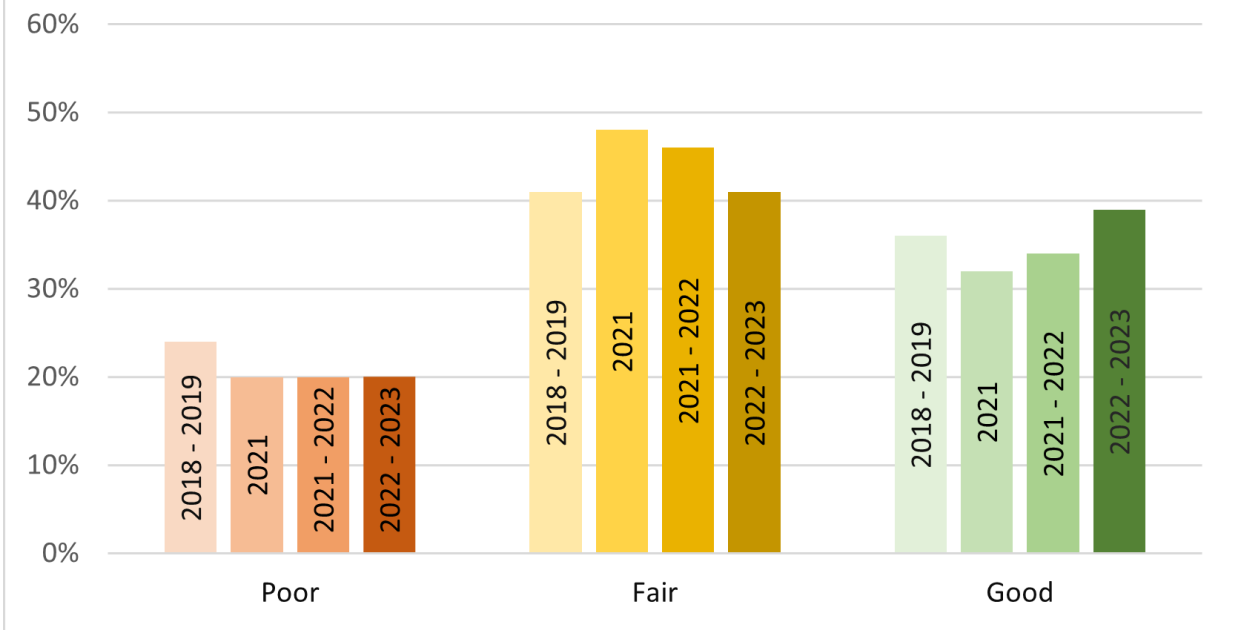
KATS Pavement Quality

Since 2004, data on the KATS area federal-aid road system has been collected and inventoried. State of Michigan Act 51 (P.A. 499 202, P.A. 199 2007) requires each local road agency to annually report the mileage and condition of the road and bridge system within their jurisdiction and report this data to the Transportation Asset Management Council (TAMC).

Pavement Surface Evaluation and Rating (PASER) uses a visual inspection to evaluate pavement surface condition. It rates various types of pavement distress on a scale of 1-10 with 1 being the worst condition, and 10 being the best. PASER helps to predict the remaining service life of a road and the type of maintenance needed, therefore, helping to identify and prioritize future road projects in the community.

Data is gathered by three-person teams made up of one MDOT employee, one member of the local road agency, and one member of from the regional planning agency. This team evaluates the pavement while driving and records the road surface type, number of lanes, and PASER rating of each road using a laptop and GPS receiver. Data is then stored and analyzed using a program called Roadsoft, developed by the Michigan Technological University's Center for Technology and Training.
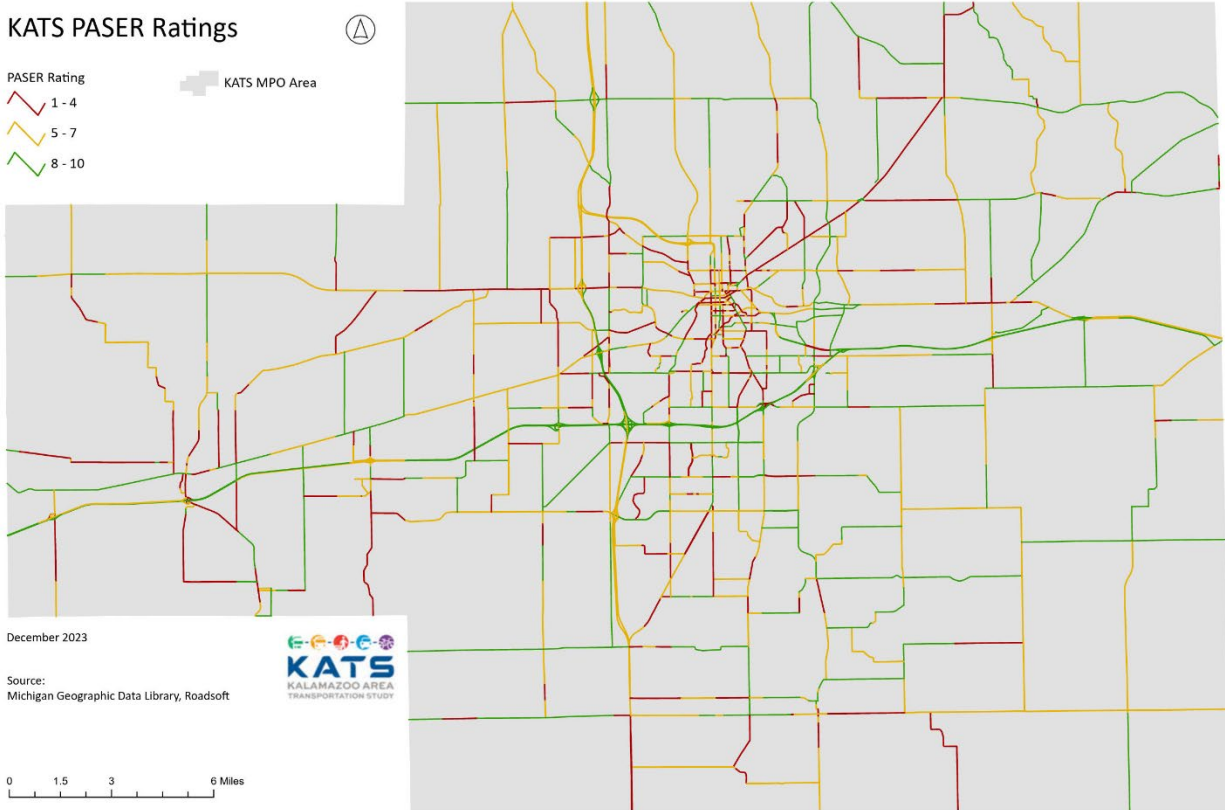

KATS Federal Aid Road Conditions 2022 & 2023

Poor, 20%
Good, 39%
Fair, 41%

KATS Federal Aid Road Conditions 2018 - 2023

Chart showing PASER condition categories Poor, Fair, and Good with bars for 2018-2019, 2021, 2021-2022, and 2022-2023.

Poor: 2018-2019 ≈24%, 2021 ≈20%, 2021-2022 ≈20%, 2022-2023 ≈20%
Fair: 2018-2019 ≈41%, 2021 ≈48%, 2021-2022 ≈46%, 2022-2023 ≈41%
Good: 2018-2019 ≈36%, 2021 ≈32%, 2021-2022 ≈34%, 2022-2023 ≈39%

KATS PASER Ratings

PASER Rating
- 1 - 4
- 5 - 7
- 8 - 10

KATS MPO Area

December 2023

Source:
Michigan Geographic Data Library, Roadsoft

KATS
KALAMAZOO AREA
TRANSPORTATION STUDY

0   1.5   3   6 Miles

System Performance – Travel Time Reliability

Travel Time Reliability relates to the consistency or dependability in travel time. It is measures from day to day, or across differing times of the day. Unreliable travel times usually occur during the "peak" periods of the day. Most travelers are less tolerant of "unexpected" delays since they cannot plan for it. The Travel Time Index (TTI) is the ratio of the congested travel time to the time it takes to make the same trip at free-flow speeds (light traffic conditions). When congestion gets worse, the TTI increases.

Performance on the National Highway System (NHS) uses Level of Travel Time Reliability (LOTTR) to measure interstate and non-interstate travel. The interstate travel time reliability measure is the percent of "person-miles" traveled that are reliable. Non-interstate travel time reliability is measured by percent of "person-miles" traveled that are reliable. These measures correspond to 80th and 50th percentile travel times.   Freight movement on the NHS is measured for reliability using the Truck Travel Time Reliability Index (TTTR) and corresponds to 95th and 50th percentile travel times.

Level of Travel Time Reliability – Interstate "person-miles" for KATS MPO		
Baseline Condition (2022-2025)	2-Year Targets	4-Year Targets
97.1%	80.0%	80.0%

Level of Travel Time Reliability – Non-Interstate "person-miles" for KATS MPO		
Baseline Condition (2022-2025)	2-Year Targets	4-Year Targets
94.4%	75.0%	75.0%

Truck Travel Time Reliability Index for KATS MPO		
Baseline Condition (2022-2025)	2-Year Targets	4-Year Targets
1.31	1.60	1.60