MISSOURI DEPARTMENT OF TRANSPORTATION

FOCUS

STRATEGIC INITIATIVES FOR CONTINUOUS IMPROVEMENT

April 2020

SAFETY • SERVICE • STABILITY

MoDOT

WWW.MODOT.ORG

Director’s Message

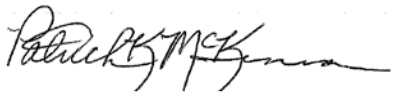
I would like to convey my sincere appreciation to everyone in the MoDOT family for the way you’re handling this unparalleled challenge. We continue to prove that the plans and preparations that are in place are working as we serve the people of Missouri from a variety of locations throughout the state.

None of that would be possible without the hard work and planning of a lot of dedicated people. Much of that is reflected in this publication.

You’ll notice a few changes in this edition. Many of the initiatives have been removed from the publication due to their completion or nearing completion. The remaining initiatives in our areas of safety, service and stability are being championed by Becky Allmeroth, Eric Schroeter and Lester Woods respectively. New initiatives are being developed by the Senior Management Team and MoDOT’s Employee Advisory Council and will be added in the upcoming months.

I want to thank you all for your continuing commitment to our department and to each other. Our goal has always been—and will continue to be—that we exercise the utmost care so that you can return home safely at the end of the day.

Thank you for your hard work and dedication! You continue to honor our mission and core values.



Patrick McKenna

MISSOURI

Department of Transportation

2020 Version 2.0

ASPIRATION

We will provide a world-class transportation system that is safe, innovative, reliable, and dedicated to a prosperous Missouri

THEMES

Safety

Keep citizens and employees safe

Service

Deliver transportation solutions of great value and use resources wisely

Stability

Preserve and operate a reliable transportation system with an engaged workforce

INITIATIVES

- Innovate to improve work zone and system-wide safety
  - Autonomous truck-mounted attenuators
  - Deploy a suite of demonstrably impactful safety techniques through a design-build program structure
- improve partnerships with other agencies and leverage private sector
  - Predictive analytics to optimize winter operations

- Improve project management tools
  - Maintenance Management Information System
- Fleet and facilities optimization strategy implementation

- Increase employee engagement and recognition
  - Pay plan
  - Training and certifications
  - Evaluate job descriptions
  - Leadership coins
  - Succession planning
- Research and deploy alternative funding solutions
  - Cross-cabinet collaboration
- Leverage innovations to reduce costs and improve service quality

RANKINGS		
1-10	=	A
11-20	=	B
21-30	=	C
31-40	=	D
41-50	=	F

A — Road Conditions

Current Performance = 92 percent major highways (5,546 miles) in good condition. 80 percent of minor highways (28,313) in good condition.
National Ranking = Missouri had the 10th best pavements on the National Highway System. (FHWA Highway Statistics)

A — Customer Satisfaction

Current Performance = 77 percent satisfied customers
National Ranking = Missouri trails the highest rated company on the American Customer Satisfaction Index by only 9 percent.

A — Project Management

Current Performance = Missouri road and bridge projects were delivered within 1.3 percent of the award amount and 92 percent were delivered on-time.
National Ranking = Not available.

A — Infrastructure for Business

Current Performance = No internal measure
National Ranking = A CNBC business study ranks Missouri's infrastructure as the 7th best for business.

A — Administrative Costs

Current Performance = $2,187 cost per mile
National Ranking = Missouri has the 3rd lowest administrative cost per mile.
**2018-2019 data is not available*

C — Congestion (travel time index)

Current Performance = Kansas City - 1.15 St. Louis - 1.15
National Ranking =Out of 101 urban areas, Kansas City and St. Louis both ranked at 23rd as some of the least congested areas in the U.S. *(Texas Transportation Institute)*

D — Number of Fatalities

Current Performance = 921 fatalities
National Ranking = Only 14 states experienced more motor vehicle deaths ranking Missouri 36th. (National Safety Council)

D — Bridge Conditions

Current Performance = 9 percent of Missouri bridges in poor condition by deck area.
National Ranking = Missouri ranked 40th for the percent of bridges in poor condition by deck area. *(FHWA Highway Statistics)*

F — Revenue

Current Performance = $50,184 revenue per mile
National Ranking = Missouri has the 48th lowest revenue per mile. *(FHWA Highway Statistics)*

F — Employee Turnover

Current Performance = 13.27 percent
National Ranking = Not available; However, **Stretch Target =** 6 percent. (Price Waterhouse Cooper's Saratoga Institute benchmark data)

MODOTVALUES

	TANGIBLERESULTS
SAFETY Be Safe	Moving Missourians Safely
Be Accountable **SERVICE** Be Respectful Be Inclusive	Providing Outstanding Customer Service Delivering Efficient and Innovative Transportation Projects Operating a Reliable Transportation System
Be Bold Be Better **STABILITY** Be One Team So we can be a great organization	Managing Our Assets Stabilizing Resources and Engaging our Workforce Building a Prosperous Economy for All Missourians

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SAFETY

Keep citizens and employees safe

- **Use Innovation to Improve Work Zone and System-wide Safety**
  - Autonomous Truck-mounted Attenuators
  - Deploy a Suite of Demonstrably Impactful Safety Techniques through a Design-build Program Structure
- **Improve Partnerships with Other Agencies and Leverage Private Sector**
  - Predictive analytics to optimize development of winter operations resources

Use Innovation to Improve Work Zone and System-wide Safety

Autonomous Truck-mounted Attenuator

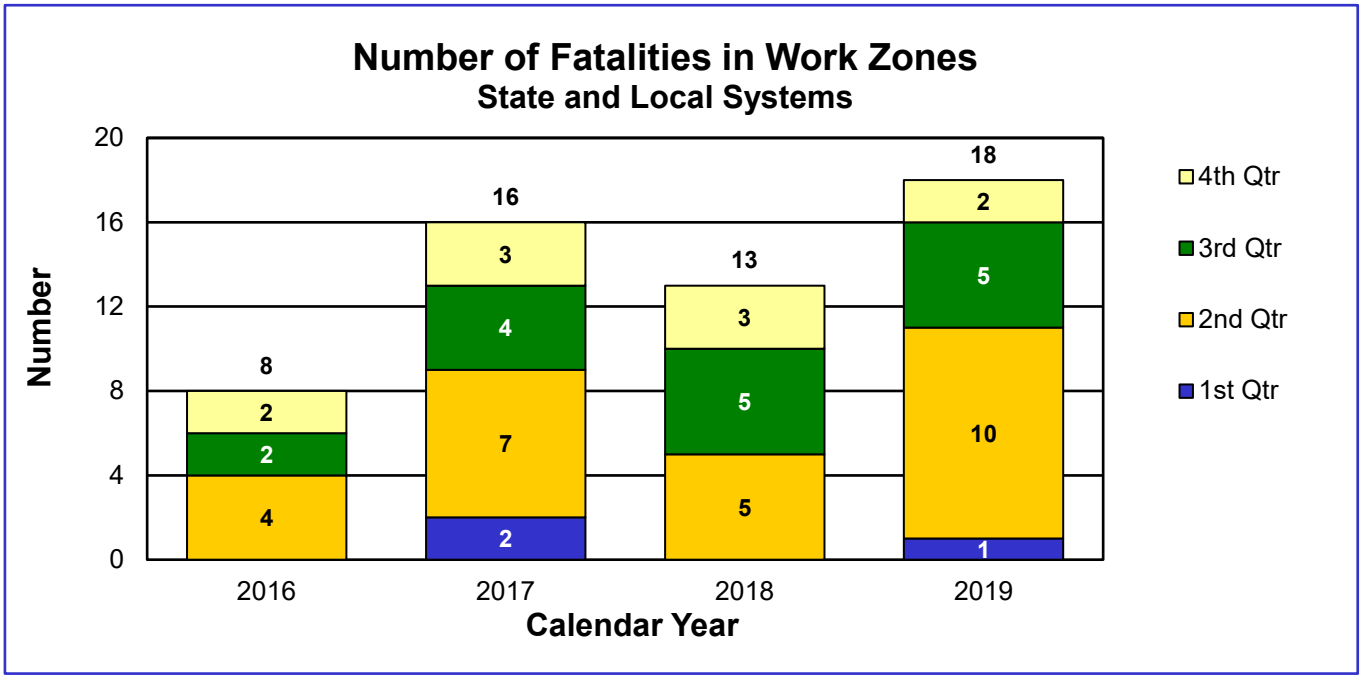
SAFETY CHAMPION:
Becky Allmeroth, Chief Safety and Operations Officer

PROJECT MANAGERS:
Chris Redline, District Engineer

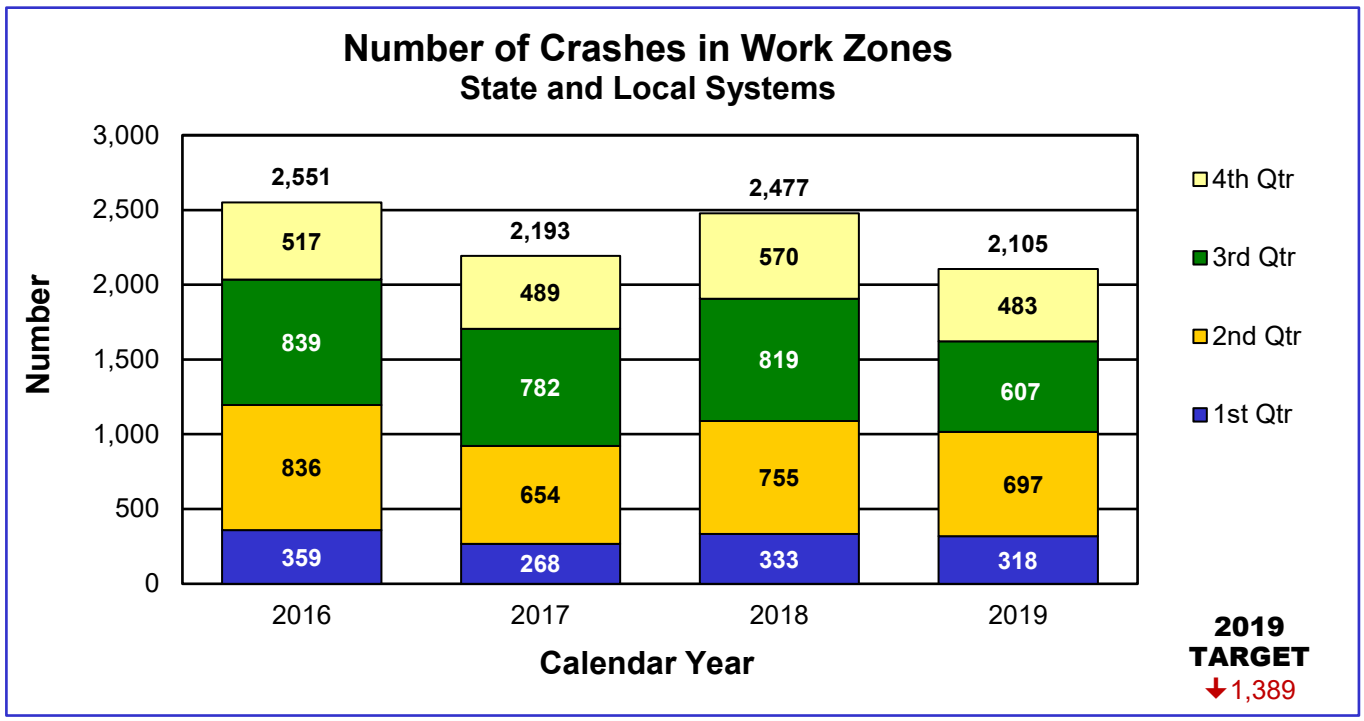
PURPOSE OF THE PROJECT:
MoDOT's commitment to safety applies to members of our work crew as well as the general public. In 2019, 17 people were killed in work zone crashes on state system routes and an additional one on the local system. The number of crashes in work zone in 2019 totalled 1,409 on state system routes and 696 on local system. MoDOT's ultimate goal is zero fatalities in work zones. There must be constant improvement in both the planning and technology we employ in the field. MoDOT is investigating the viability of a driverless truck-mounted attenuators used in moving operations such as sweeping and striping. Success of this project could pave the way to eliminate all injuries caused by drivers crashing into the rear TMA.

The project is evaluating leader-follower technology with the goal of removing the driver from the rear TMA, the one most crashed into by drivers. During testing though, the rear TMA has a safety operator with the ability to immediately take over manual control of the truck. The driverless rear TMA simply follows the path of the staffed lead vehicle at adjustable distances. The system passed Phase 1 testing last May but began to exhibit navigation problems during Phase 2 testing in June. The contractor installed system upgrades late last year to correct the problems. Initial testing of the upgrades looked very promising. Social distancing requirements, as a result of the COVID-19 pandemic, prevents us from resuming testing since two operators need to be in the lead vehicle. We are prepared to resume testing once social distancing requirements allow.

Use Innovation to Improve Work Zone and System-wide Safety



First quarter 2020 data is unavailable through the MSHP radio reports and is incomplete in TMS.



First quarter 2020 data is unavailable through the MSHP radio reports and is incomplete in TMS.

Deploy a Suite of Demonstrable Impactful Safety Techniques through Data-Driven Safety Analysis

SAFETY CHAMPION:
Becky Allmeroth, Chief Safety and Operations Officer

PROJECT MANAGER:
Jon Nelson, Assistant to the State Highway Safety and Traffic Engineer

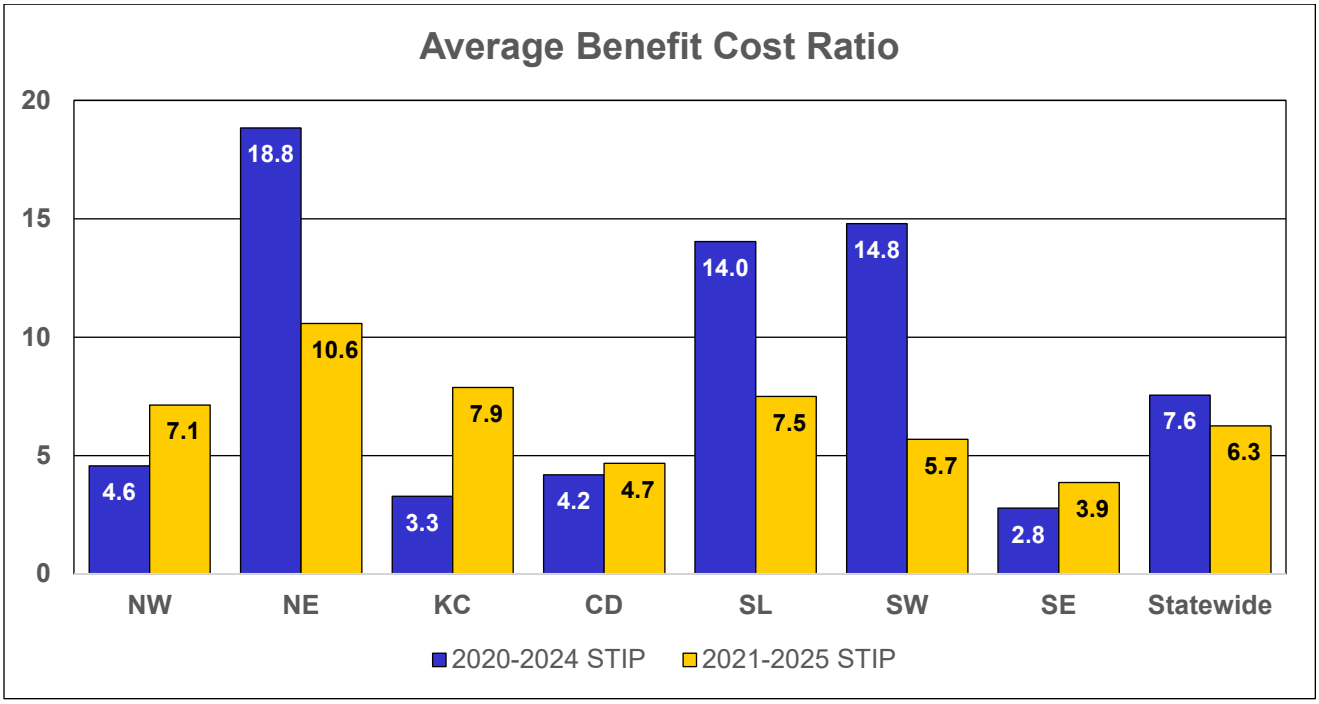
PURPOSE OF THE PROJECT:
While many safety improvements can reduce fatal and serious injury crashes, using a data-driven approach allows the department to prioritize improvements with the greatest potential to prevent injuries and save lives. Objective and quantifiable analyses like those found in AASHTO's Highway Safety Manual can help determine the most cost-effective measures for various types of roadways. The data not only helps make better decisions during the project development phase, but also helps inform the public as to what safety benefits they can expect from their investment.

Data-driven safety analysis (DDSA) improvements may be identified on a project level basis or on a program level. For systemic analysis, DDSA is used to identify high-risk roadway features that correlate with particular crash types. Severe crashes are widely dispersed, and their location and frequency fluctuate over time. Systemic analysis identifies locations that are at risk for severe crashes, even if there is not a recent history of severe crashes. Low-cost countermeasures can then be applied systemically across those locations. This approach helps ensure funds are expended in the locations with the greatest risk for severe crashes.

The focus of this measure will be to track how DDSA is utilized in the districts to maximize safety funds. The measure will track the estimated number of fatal and serious injury crashes reduced for every safety dollar invested. The Highway Safety and Traffic Division will help review and prioritize safety projects during the draft Statewide Transportation Improvement Program phase and also help estimate the anticipated impacts on crashes. The data will be updated annually in accordance with the STIP cycle.

The following chart and table are based on estimated reductions in fatal and serious injury crashes resulting from projects included in the first three years of the STIP. Benefits are calculated over the expected life of the improvements. For the first three years of the 2021-2025 STIP, the department expects to see $6.30 in return for every $1 spent in safety improvements. While this represent a slight decrease in the expected return of the 2020-2024 STIP, the department has continued to refine analyses used to determine the impacts of safety improvements. This has resulted in more consistency across districts and less variability in the results.

Use Innovation to Improve Work Zone and System-wide Safety



Totals for State Fiscal Years 2021-2023				
	Estimated Severe Crashes Reduced (Over the Life of the Improvements)	**Total Safety Dollars Programmed**	**Benefit Cost Ratio**	**Estimated Severe Crashes Reduced for Every $1 Million Programmed**
NW	25	$8,814,000	7.1	2.9
NE	24	$5,539,000	10.6	4.2
KC	104	$33,076,000	7.9	3.2
CD	81	$43,029,000	4.7	1.9
SL	94	$31,348,000	7.5	3.0
SW	48	$20,907,000	5.7	2.3
SE	29	$18,584,000	3.9	1.5
Statewide	**405**	**$161,297,000**	**6.3**	**2.5**

Improve Partnerships with Other State Agencies and Leverage Private Sector

Predictive Analytics to Optimize Winter Operation Resources

SAFETY CHAMPION:
Becky Allmeroth, Chief Safety and Operations Officer

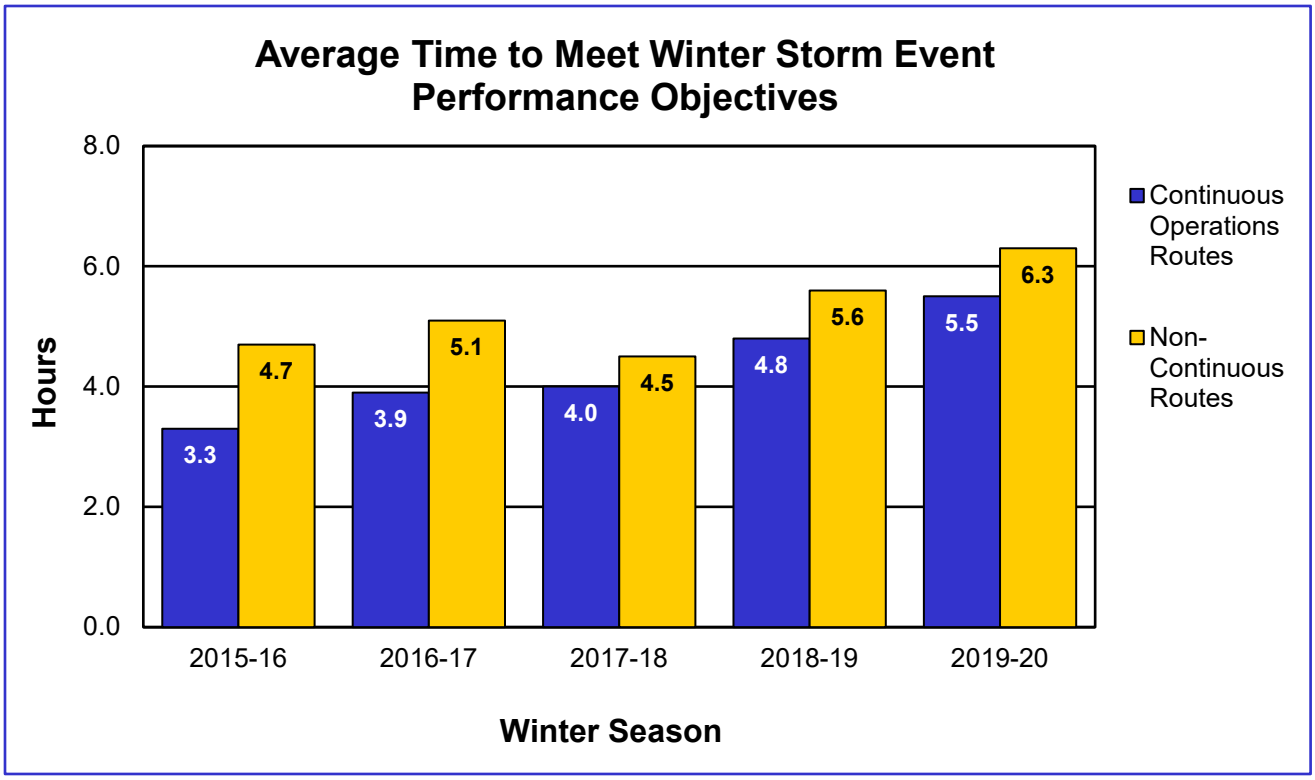
PROJECT MANAGER:
Alex Wassman, Traffic Management and Operations Engineer

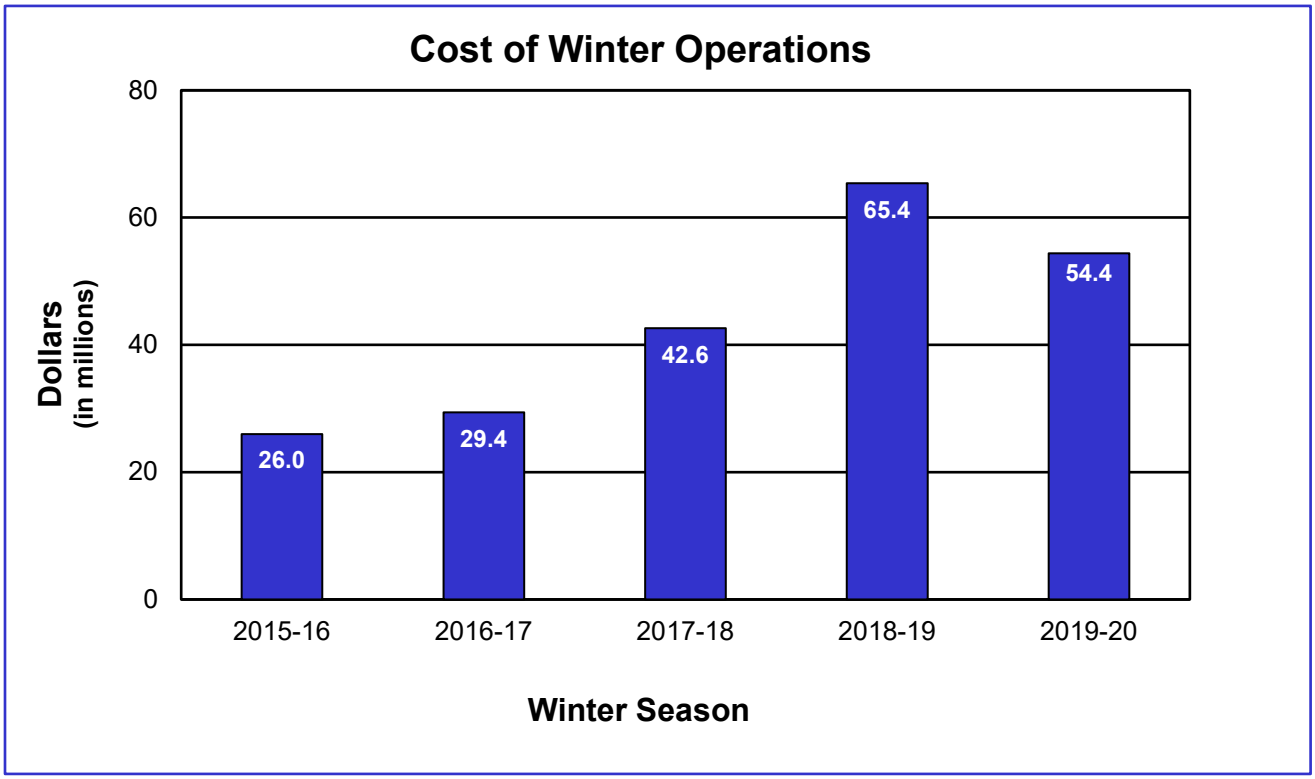
PURPOSE OF THE PROJECT:
Costs associated with over or under preparedness of severe weather events aren't easily captured and are seldomly reported. Simple atmospheric weather forecasts do not tell the whole story and, as a result, MoDOT has sometimes incurred additional costs for storms which never materialized or been caught off guard when storms arrived in advance of expectations.

Road condition prediction is a better gauge for anticipating when conditions warrant treatment and advance traveler information. By partnering with FHWA on the Integrated Modeling for Road Condition Prediction pilot project, MoDOT will be the first DOT in the country to access a simple-to-use, web-based tool that utilizes both historic real-time data to more accurately predict when road conditions are likely to deteriorate. This will enable MoDOT staff to better prepare for adverse road conditions and strategically deploy crews where they are most needed.

This tool will provide the ability to predict conditions up to eight hours in the future and, conversely, enable accurate after-action reviews of MoDOT's response. This will facilitate improved efficiency of resources and timeliness in response.

Improve Partnerships with Other State Agencies and Leverage Private Sector





SERVICE

Deliver transportation solutions of great value and use resources wisely

- **Improve Project Management Tools**
  - Maintenance Management System
- **Fleet and Facilities Optimization Strategy Implementation**

Improve Project Management Tools

Maintenance Management System

SERVICE CHAMPION:
Eric Schroeter, Assistant Chief Engineer

PROJECT MANAGER
Michael Middleton, Maintenance Liaison Engineer

PURPOSE OF THE PROJECT:
With maintenance staff constituting about 54 percent of salaried employment at MoDOT and with about 23 percent of MoDOT's budget being used to accomplish maintenance related tasks, it makes sense to look at the challenges that staff has in recording and finding data related to what gets accomplished by this important organizational division. Multiple software programs, difficulty in documenting work, and challenges in finding maintenance-related information is substantial.

MoDOT has created a Maintenance Management System that is simple to use, web-based program for capturing and easily reporting data related to what gets accomplished in maintenance. As of March 15th all 191 Maintenance Organizations are utilizing the MMS. There is nearly 2800 maintenance workers daily entering their individual hours worked, equipment usage, job location and materials usage. Our MMS Help Desk is daily providing guidance to our co-workers on MMS items. Utilization of MMS is significantly increasing as all of MoDOT realizes the benefits of the information.

Date	MT Orgs Live	Cumulative	%	Cumulative %	# of Employees	Cumulative	Fully Implemented
11/17/2019	9		5		118		
12/1/2019	21	30	11	16	334	452	
12/8/2019	10	40	5	21	132	584	
12/15/2019	27	67	14	35	434	1,018	
1/13/2020	42	109	22	57	601	1,619	NW
1/19/2020	23	132	12	69	314	1,933	
1/26/2020	9	141	5	73	111	2,044	SE
2/16/2020	24	165	12	86	368	2,412	NE, SW
3/1/2020	13	178	7	93	154	2,566	CD
3/8/2020	12	190	7	100	109	2,725	SL
3/15/2020	1	191	0.5	100	23	2,748	KC

Phase 2 is actively progressing with implementing enhancements to Phase 1 and creating new functionality. As of the end of March, 33 enhancements have been implemented to the live environment of MMS to improve the performance and ease of capturing accurate data. Additional enhancements are being addressed as the we transition into Phase 2 MMS functionality for Work Plans. Work Plans are now the central focus for our resources with an anticipated implementation date of late fall 2020.

CHART UNDER DEVELOPMENT

Fleet and Facilities Optimization Strategy Implementation

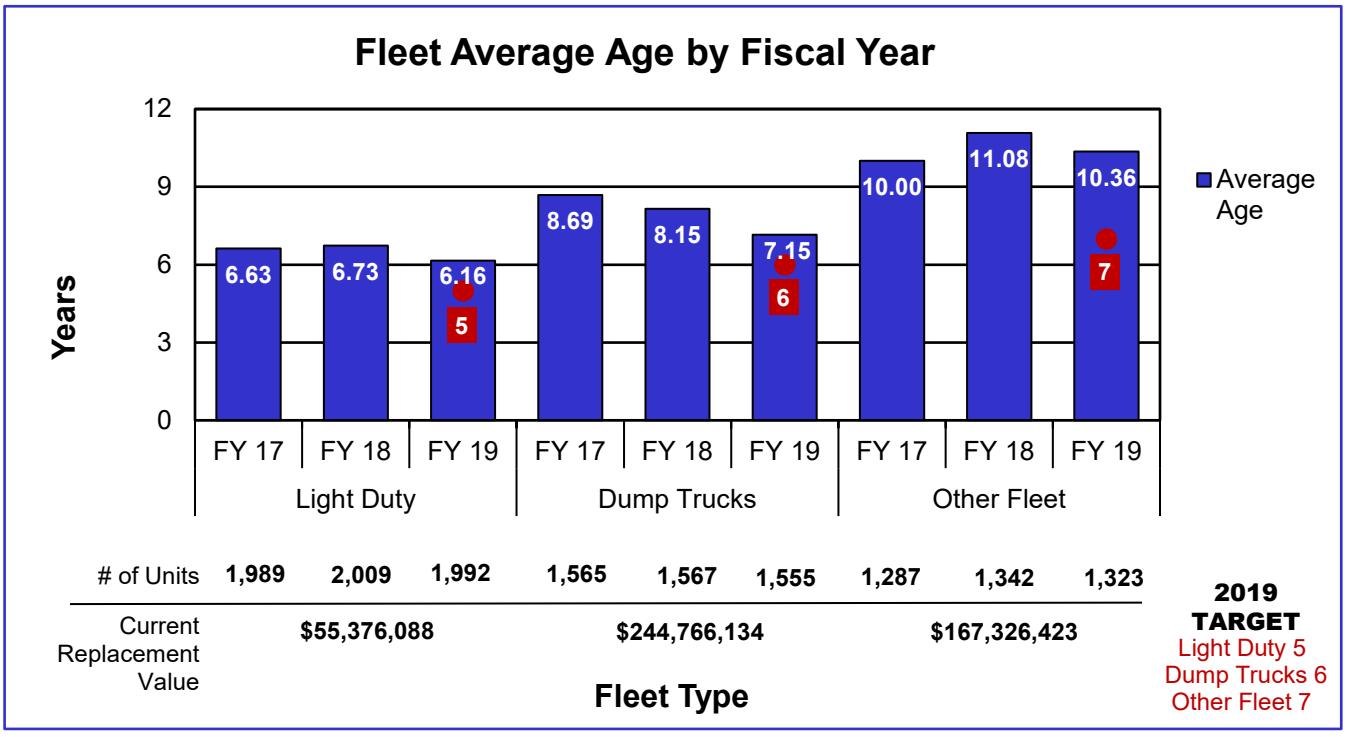
Fleet Optimization

SERVICE CHAMPION:
Eric Schroeter, Assistant Chief Engineer

PROJECT MANAGER:
Amy Niederhelm, Central Office General Services Manager

PURPOSE OF THE PROJECT:
MoDOT must keep a dependable fleet to meet customer's needs. The fleet age is the best indication of fleet condition. The large investment in fleet, with a replacement value over $475 million, emphasizes the importance. MoDOT is moving toward an asset management approach for fleet using data to plan fleet purchases over the next several years.

In FY 2019, the average age for Light Duty fleet, Dump Truck fleet and Other fleet (includes equipment such as backhoes, loaders, tractors and specialty items like under bridge inspection units and stripers) shows gradual decreases. This is attributed to purchasing equipment based on the asset management approach. The goal is for the average age to be half the department's age threshold.



Fleet and Facilities Optimization Strategy Implementation

Facilities Optimization

SERVICE CHAMPION:
Eric Schroeter, Assistant Chief Engineer

PROJECT MANAGER:
Levi Woods, Central Office General Services Manager

PURPOSE OF THE PROJECT:
Facilities Optimization provides a similar asset management process for MoDOT facilities as is used by the Department for roadways. Like the Statewide Transportation Improvement Program, MoDOT facilities assets are placed into a rolling five-year budget based on needs. Facilities are currently funded at $7.2 million annually for Capital Improvement and Asset Management purposes. The charts depict MoDOT's progress toward meeting our goal of having facilities that meet minimum functional needs and the facility systems maintained which keep the facility operational.

Facilities staff utilizes Vanderweil Facility Advisor, a computer-based program, to inventory, with age and condition of all buildings and improvements. Individual systems within the building are inventoried, with all units having a specified lifecycle. Based on actual annual inspections, the asset's lifecycle is determined to be either due for early replacement, replace at end of calculated life, or the lifecycle can be extended based on actual observed conditions. These options allow MoDOT the flexibility to optimize and maximize the useful life of each asset.

Facilities Asset Management and the Long Term Facilities Plan are currently funded at $7.2 million annually. In 2014, the Long-Term Facilities Planning Team recognized in order to be functional and operate, facilities have many necessities including space for mechanics to work inside during inclement weather, adequate restrooms for employees, sufficient meeting space for muster sessions and cold storage for operational supplies and equipment. Due to ever changing conditions at MoDOT facilities, the Long Term Facilities Planning Team reviews the needs and allocation of funds for each program on an annual basis. Funds are then allocated to the Capital Asset Preservation Plan (CAPP or Asset Management) and the Long Term Facilities Plan (Capital Improvement Plan- CIP). The $7.2 million budget is allocated based on needs with $6.85 million allocated to the CAPP and CIP Plans, with the remaining funds available for asset management of weigh scales, rest area/welcome centers, and design consultants.

Fleet and Facilities Optimization Strategy Implementation

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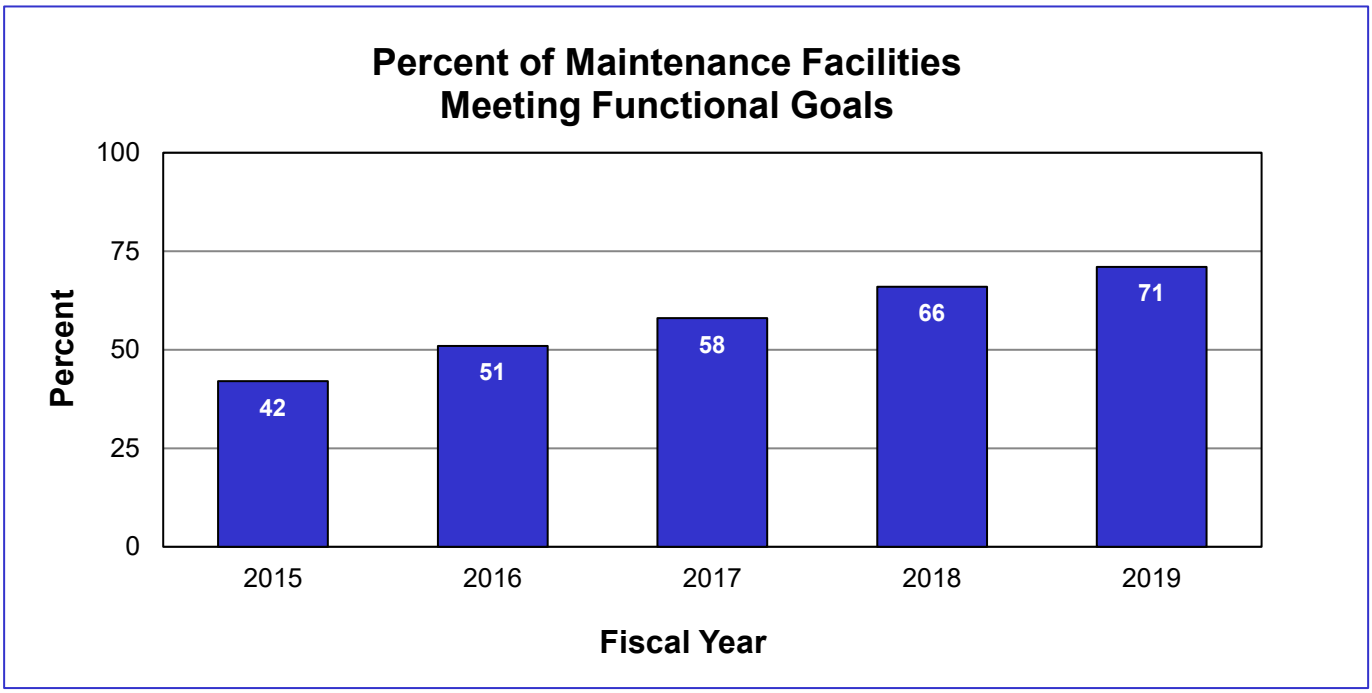
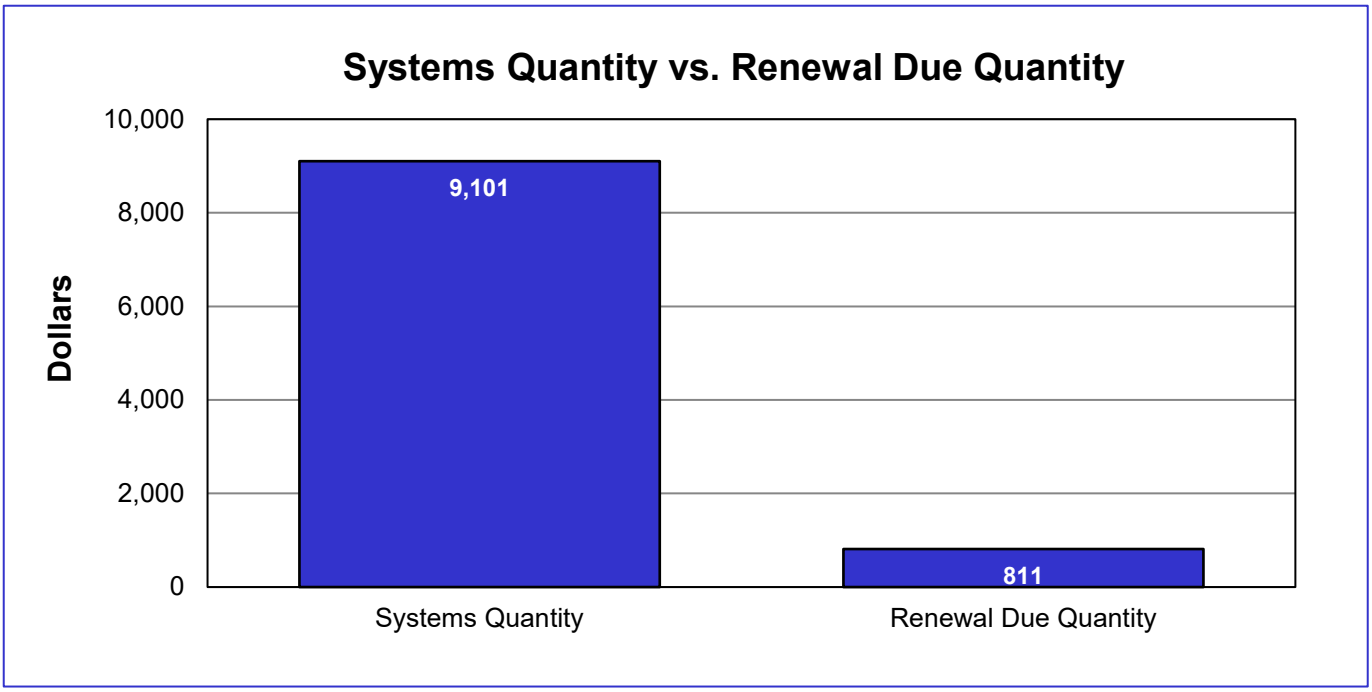
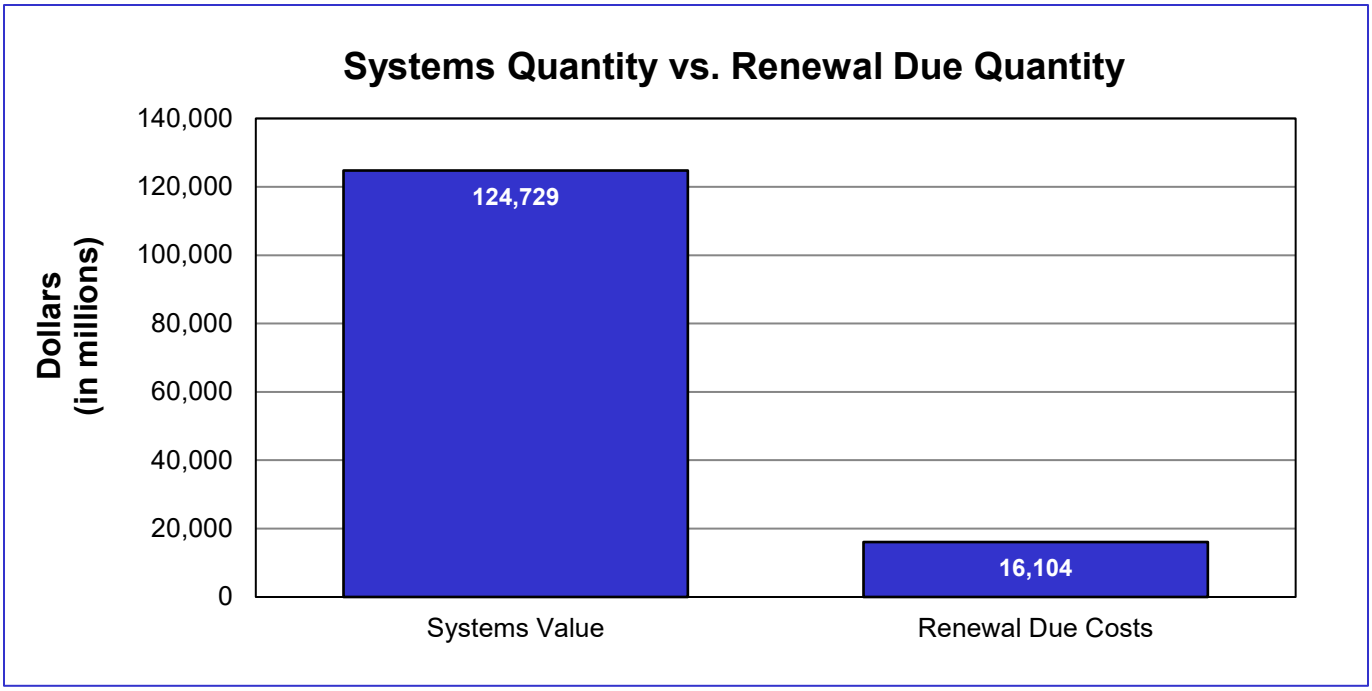




Fleet and Facilities Optimization Strategy Implementation



STABILITY

Preserve and operate a reliable transportation system with an engaged workforce

- **Increase Employee Engagement and Recognition**
  - Pay Plan
  - Training and Certifications
  - Evaluate Job Descriptions
  - Leadership Coins
  - Succession Planning
- **Research and Deploy Alternative Funding Solutions**
  - Cross-cabinet Collaboration
- **Leverage Innovations to Reduce Costs and Improve Service Quality**

Increase Employee Engagement and Recognition

Employee Engagement and Cost of Turnover

STABILITY CHAMPION:
Lester Woods, Chief Administrative Officer

PROJECT MANAGER:
Paul Imhoff, Special Projects Coordinator

PURPOSE OF THE PROJECT:
Employee turnover not only has a direct impact on MoDOT's ability to preserve and operate a reliable transportation system, but also reflects the level of employee engagement within MoDOT. Increasing employee engagement and reducing turnover and its subsequent costs are prudent goals toward organizational stability and a wise use of taxpayer dollars.

For the first three quarters of fiscal year 2020, MoDOT turned over 491 employees. This places MoDOT on track to turn over 655 employees in FY 2020. Applying a Society for Human Resources Management turnover cost calculator to these estimates, we can anticipate the hard cost of backfilling positions to be $2.08 million for FY 2020. For the same period, the soft cost of turnover is estimated to be $32.36 million. This total of $34.46 million would be a fractional decrease over FY 2019 total turnover cost.

Efforts to improve the stability of MoDOT by increasing employee engagement and retention have been implemented and continue.

- **Pay Plan:** For fiscal year 2020, MoDOT implemented a pay plan on January 1, 2020 providing a 1.1 percent cost of living increase, plus a two-step increase for salaried employees on steps 1-8 of their salary range, and a one-step increase for employees on step 9-17 of their range. Every salaried employee received at least a 3 percent increase.

  For fiscal year 2021, MoDOT submitted a legislative budget request to fund a one-step pay increase for employees below step 10 of their pay ranges starting in January 2021, and for the first year of a three-year plan to raise pay for jobs that are least competitive with the market and have the highest rates of turnover. While the Governor recommended these items, given the state's economic situation related to the pandemic, any pay plan in fiscal year 2021 seems unlikely.

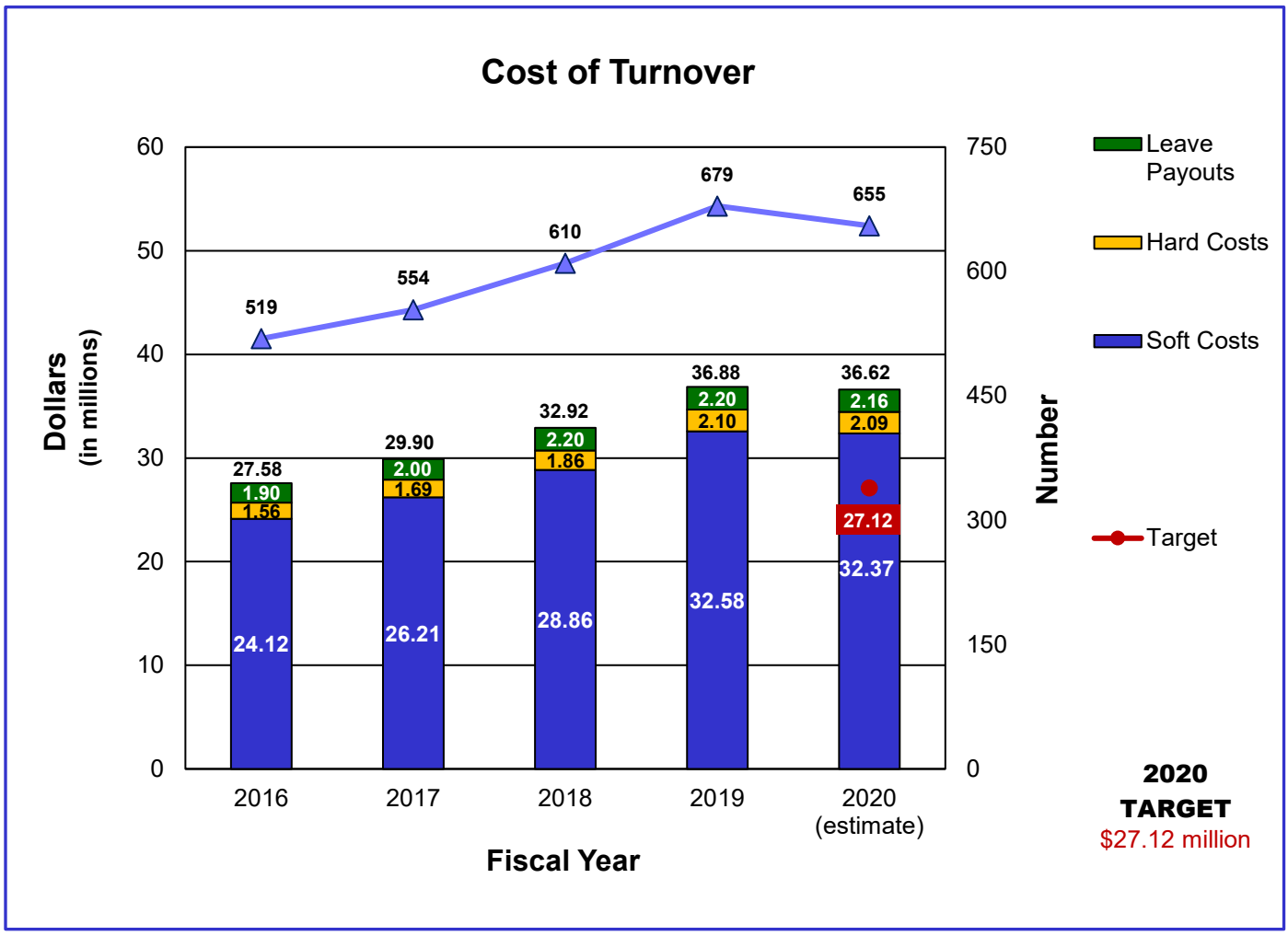
- **Training and Certifications:**
  - **Registered Apprenticeship Program**: The registered apprenticeship program is officially open for enrollment. The current emphasis is on helping people get enrolled in both the Department of Labor and Veteran's Affairs programs. Also, a focused effort is underway to partner with the Department of Economic Development's Workforce Development Division to enhance MoDOT's recruitment efforts and develop partnerships with Missouri colleges and universities to grant college credit for employees who

Increase Employee Engagement and Recognition

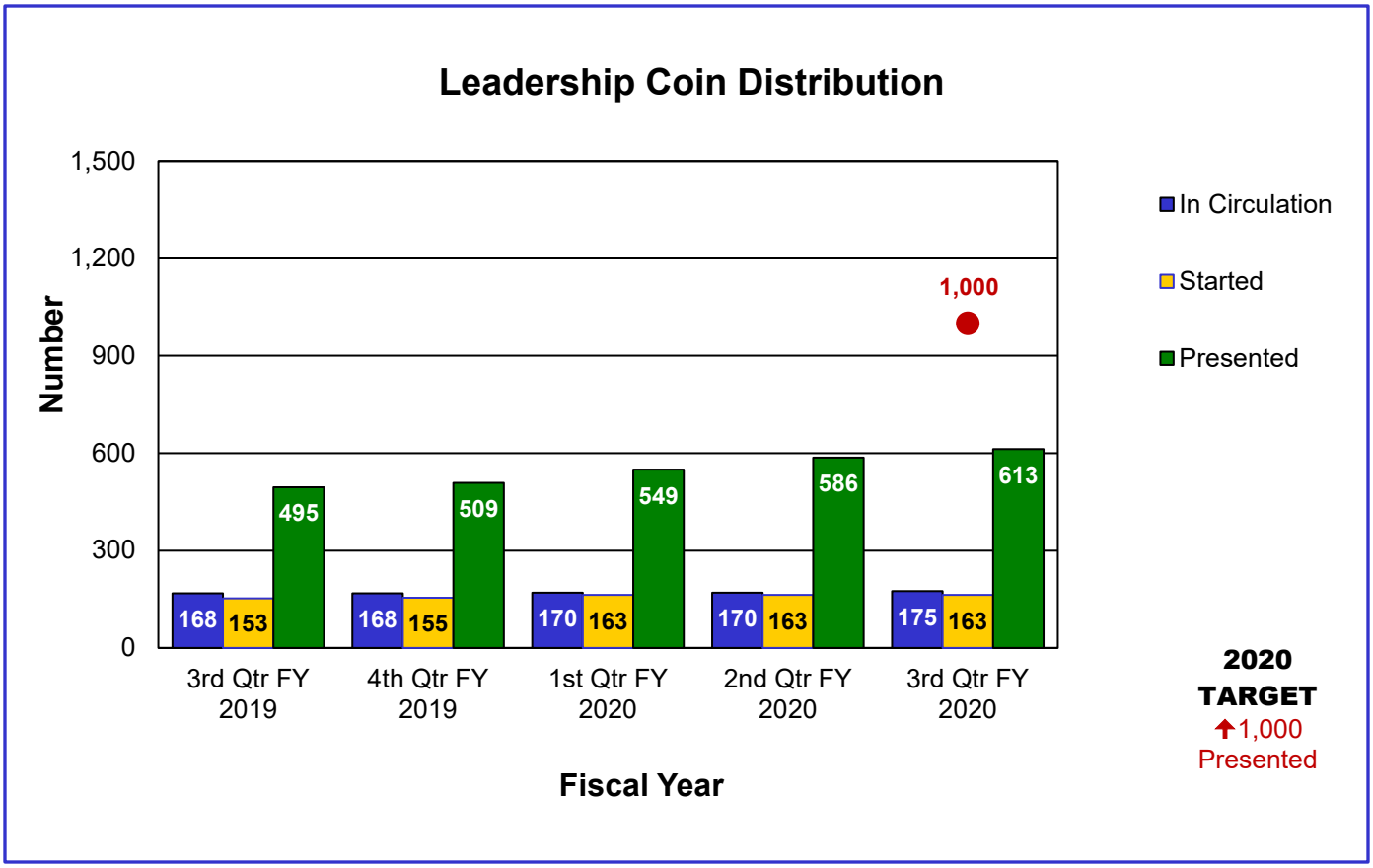
complete registered apprenticeships with MoDOT. There are currently 22 employees enrolled in the program, up from 5 in the first quarter of FY 2020.

- **Leadership Coins:** The Leadership in Action recognition coin passing program has been in effect since September 2017. The purpose of the program is for coin holders to look for leaders within MoDOT who are actively demonstrating MoDOT's Values and/or moving MoDOT forward in the areas of Safety, Service or Stability. Each coin will be passed ten times and will be subsequently retired. There are currently 175 coins in circulation that have been presented 613 times. Five coins have been retired.

- **Evaluate Job Descriptions:** This phase of the Succession Planning process began in January 2020 starting with the Construction and Materials functions of the department. Those classifications are being validated, while Design and Right of Way have begun the process.



Increase Employee Engagement and Recognition



Research and Deploy Alternative Funding Solutions

Cross-Cabinet Collaboration

STABILITY CHAMPION:
Lester Woods, Chief Administrative Officer

PROJECT MANAGER:
Liz Prestwood, Policy/Innovation Program Manager

PURPOSE OF THE PROJECT:
The current Missouri vehicle registration fee is based on taxable horsepower, an archaic measure which bears no correlation with vehicle power, vehicle weight, or impact caused on infrastructure. Missouri is the only state using taxable horsepower to assess vehicle registration fees.

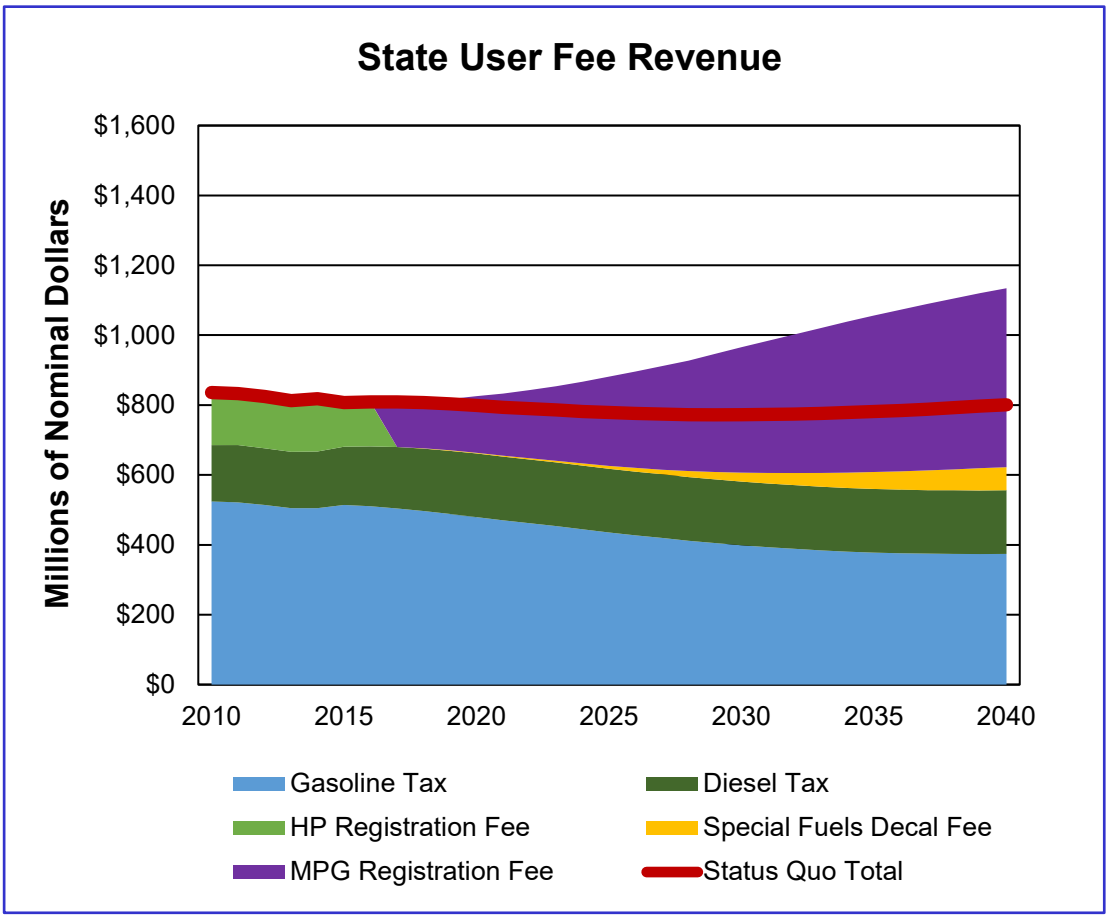
Missouri has been the recipient of three consecutive Surface Transportation System Funding Alternative (STSFA) federal grants totaling $4,805,000. The first award was to perform pre-deployment activities for concept feasibility in the amount of $250,000. Phase two award provided $2,772,500 and is being used to determine existing system capabilities for implementation and further investigates the impacts to Missouri residents through a Highway Cost Allocation and Revenue Attribution Study (HCARAS) and Rural Urban Transportation Funding Analysis. In 2019 MoDOT received a third STSFA award in the amount of $1,782,500 for the design and implementation of an MPG based registration fee.

The initial work and deliverables from the Department's STSFA activities modeled how an MPG-based fee could be used to supplement and or replace the current registration fee schedule. The project team began work with Missouri Department of Revenue (DOR) in 2018 to explore existing system capabilities to collect this type of fee and identify gaps. This DOR-led study concluded in January 2019. The consultant presented five options of varying cost to implement an MPG-based fee structure. This cross-cabinet effort is ongoing and the preferred implementation option has not been selected. Legislation has been filed in the 2019 Missouri General Assembly to support this MPG-based registration fee.

Two additional studies are underway to fully understand impacts of an MPG based registration fee. A revenue study will determine the typical impacts (per year, per mile, per driver etc.) of highway use and will provide a quantitative basis for the fees attributed to non-gasoline and non-diesel vehicles. The second study currently underway will analyze fees paid by rural and urban drivers under the proposed MPG-based registration fee system, considering the commuting behaviors and vehicle characteristics of highway users statewide.

The principal project goals are to generate revenue consistent with technological trends in the motor vehicle market and to ensure privacy and security for Missouri drivers while utilizing current adaptable technologies to collect and administer the fee.

Research and Deploy Alternative Funding Solutions



Leverage Innovations to Reduce Costs and Improve Service Quality

Innovations Challenge - Innovation Implementation

STABILITY CHAMPION:
Lester Woods, Chief Administrative Officer

PROJECT MANAGER:
Kelly Backues, Transportation Planning Specialist

PURPOSE OF THE PROJECT:
Preserving and operating a reliable transportation system takes an engaged workforce. MoDOT's Innovations Challenge program provides employees opportunity and recognition for their efforts to leverage innovations so the department may reduce costs and improve service quality.

The redesigned Innovations Challenge SharePoint site continues to serve as a great resource to MoDOT employees with easy to find documents and best practices database, as well as prior year virtual showcase videos. The statewide distribution of funds process to implement best practices was approved for the second year in a row, and 13 maintenance-related innovations were allotted funds to implement them statewide. Continuing the distribution of funds to implement best practices will continue to enhance the program's participation.

Measure Under Development