



# State of Missouri

## 2018 Governor's Award for Quality and Productivity

### Executive Summary

**Project or Team Name:** TMA (Truck Mounted Attenuator) Flagger

**Nominator:** Brittany Goetz

**Nominating Department:** (Nominations must include names of all agencies/departments/organizations/businesses, etc.) Missouri Department of Transportation

**Category:** Efficiency/Process Improvement

**Executive Summary:** (Executive Summary page must be 500 words or less, 12 points, Times New Roman font, and left justified. Attach the Executive Summary to the front of the nomination.)

John Johnson was hit and killed on November 11, 2015 while flagging traffic for a guardrail contractor on 13 highway in Johnson County, Missouri.

On April 7, 2016 MoDOT Maintenance Crew member Lyndon Ebkar was struck and killed by a motorist while he was flagging traffic for a bridge flushing operation. MoDOT lost two Missouri flaggers in less than six months.

It became apparent that MoDOT had a challenge that must be faced. The challenge was to create a more efficient flagging process that would get MoDOT flaggers off the road's surface and make the different elements of traffic and traffic control a more safe and effective process for employees and customers.

The creation of the TMA Flagger began in December 2015. It became a top priority in April 2016 and it hit the road for an official closed course test in September of 2016. MoDOT began using the TMA Flagger on the road in November 2016, after FHWA approval. The innovation went through a couple of rounds of changes, to become what it is today.

Today, the TMA Flagger can be used to replace a human flagger in any situation that requires a human flagger to stand on the road surface.

The TMA Flagger uses a boat trailer style TMA that is modified to become an AFAD (Automated Flagger Assistance Device), allowing for clearer direction to motorists by incorporating three color variable message boards and an automated stop/slow paddle with flashing red and yellow signals.

Using the TMA Flagger replaces the need for a human flaggers on the ground and protects the work area of the TMA. This innovation is also providing better direction to motorists, protecting them and preventing distracted motorists from hitting the TMA. This innovation also simplifies work as it is mobile and flexible enough to fit on all heavy duty fleet vehicles. It saves time in setting up work zones, and moving from work zone to work zone is now quicker. Productivity can be increased as well, as work can still be completed in unfavorable weather conditions.

The TMA Flagger has made setting up and working in work zones more efficient, and has also made it a safer environment for workers and the travelling public.



# State of Missouri – 2018 Governor's Award for Quality and Productivity

## NOMINATION FORM

### I. GENERAL INFORMATION

**Department:** Missouri Department of Transportation

**1. Project or team name:** TMA (Truck Mounted Attenuator) Flagger

**2. List the name of all team members, job titles, state agency department, and/or other organizations including public, private sector or business:** *(Please list alphabetically by last name – 2 to 20 team members maximum.)*

Travis Teter, Maintenance Supervisor, Missouri Department of Transportation

David Eppright, Maintenance Supervisor, Missouri Department of Transportation

Russell Fisher, Maintenance Crew Leader, Missouri Department of Transportation

Chris Zurn, Equipment Technician Supervisor, Missouri Department of Transportation

**3. Nomination Category:** *(Check only one.)*

☐ INNOVATION

☐ CUSTOMER SERVICE

☒ EFFICIENCY / PROCESS IMPROVEMENT

**4. Explain why you selected this category:** MoDOT employees created a way to do their business safer, quicker, and more efficiently. The TMA Flagger is saving lives while also making the flagging process more efficient. Using this innovation saves time as the TMA Flagger is flexible enough to quickly attach to almost any heavy duty fleet vehicle. It saves time in setting up work zones and in moving from work zone to work zone, improving the process. Using the TMA Flagger improves efficiency by enabling flaggers to endure much harsher conditions than before, such as extreme heat or extreme cold that would normally require a crew to postpone work or move along with frequent interruptions due to weather conditions. This innovation is also providing better direction to the travelling public, protecting them and the TMA, as well.

This MoDOT team was innovative in their thinking and came up with a tool that makes the flagging process more efficient while providing better customer service, and most importantly, saves lives.

### II. BACKGROUND

**1. When did the team begin its work?** December 2015

**2. What date did the team initiate the implementation phase of the project?** November 2016

**3. Is the project:**

☐ Time Limited

☒ Completed

☐ Ongoing

### III. PROJECT DESCRIPTION

**1. Why was the project necessary?**

John Johnson was hit and killed on November 11, 2015 while flagging traffic for a guardrail contractor on 13 highway in Johnson County, Missouri.

On April 7, 2016, MoDOT Maintenance Crew member Lyndon Ebkar was struck and killed by a motorist while he was flagging traffic for a bridge flushing operation. MoDOT lost two Missouri



flaggers in less than six months.

The challenge was to create a more efficient flagging process that would get MoDOT flaggers off the road's surface and make the different elements of traffic and traffic control a safer and more effective process, providing a safer work environment for employees, a more efficient way of doing business and a better operation that would benefit the customers.

**2. What were the primary goals of the project?** To remove workers from the roadway and improve efficiency of the flagging process with automation. *(150 words or less.)*

**3. Describe the project:**

The TMA Flagger can be used in any situation that requires a human flagger to stand on the road surface.

The TMA Flagger uses a boat trailer-style TMA that is modified to become an AFAD (Automated Flagger Assistance Device), allowing for clearer direction to motorists by incorporating three-color, variable message boards and an automated stop/slow paddle with flashing red and yellow signals.

Using the TMA Flagger replaces the need for a human flagger on the ground and protects the work area of the TMA. This innovation is also providing better direction to motorists, protecting them and the TMA. This innovation simplifies work since it is mobile and flexible enough to fit on all heavy duty fleet vehicles. It saves time setting up work zones and moving from work zone to work zone is now quicker. Productivity can be increased as well as work can still be completed in unfavorable weather conditions.

*(200 words or less.)*

**4. What technology, if any, was used in the development, implementation, maintenance or measurement of the project?** The TMA flagger utilizes multi-color, variable message boards as a more informative back up vehicle for mobile operations. *(150 words or less.)*

**5. Explain how the accomplishment of the team exceeds its regular duties and responsibilities.** The TMA Flagger was designed and created in addition to the team's regular job duties. Each team went above and beyond their normal job responsibilities to create something that would benefit MoDOT and the public. *(150 words or less.)*

**6. Which of the following describes the intended benefits of the project?** (Check all that apply and provide an explanation.)

☒ Cost Reduction

☒ Time Savings

☒ Increased Effectiveness

☒ Improved Process

☒ Other: Describe

## IV. RESULTS / MEASUREMENT

**1. Explain how the success of the project was measured and what outcomes were achieved.**

(Section III, Q6 ctd...)

The TMA Flagger has had several measurable positive outcomes:

--It is a more efficient way to set up work zones as it provides better direction to motorists while protecting the work areas

--It also eliminates the need for a flagger on the ground making it a safer work environment

--It simplifies work since it's flexible enough to fit on all heavy duty fleet vehicles.

--It saves time setting up a work zone and moving from work zone to work zone.

--It saves money by increasing productivity in unfavorable weather conditions.

(Section IV, Q1)

MoDOT received permission from the Federal Highway Administration to do official road testing. The team was connected with the University of Missouri to do a field study of the unit and create a simulator that would be used to conduct another study to show the effectiveness of the TMA Flagger in direct comparison to a human flagger.

Testing occurred on two different dates in January of 2017 in Johnson County.

On January 30, 2017, the TMA Flagger was positioned in the North bound lane. A total of 229 cars safely passed through the work zone. Of the 229 cars, two cars required the use of the panic light system with air horn to keep them in their proper lane of traffic. These two cars both tried to move around the TMA, and the operator used the panic lights and air horn system briefly and both vehicles stopped immediately. The panic light system only was used on seven cars to get them to come around the TMA Flagger when the TMA direction went from stop to slow. It appeared drivers were not paying attention to the TMA. Once the lights were used, the cars moved appropriately around the TMA.

On January 31, 2017, the TMA flagger was positioned in a South bound lane. A total of 226 cars safely passed through the work zone. Of the 226 cars, three required the panic light system with air horn to keep them in their proper lane of traffic. As before, all three cars tried to move around the TMA while the TMA was in stop mode. All three cars reacted to the panic lights and horn by stopping before entering the wrong lane of traffic. The panic light system only was used on one car to get them to come around the TMA Flagger when switched from the stop position to the slow position.

Since testing, MoDOT has put TMA Flaggers on the road anytime possible.

Previously, human flaggers had to stand in the roadway of work zones. With the creation of the TMA Flagger, human flaggers are out of the roadway. While this has achieved many measurable outcomes, the most important outcome, is the reduction of lost lives.

(Explanation should not exceed 300-500 words.)

**2. Are the benefits derived from this project:** (Check only one.)

☒ Recurring

☐ One-time

**3. If recurring, how will the benefits be sustained?** The creation of the TMA Flagger began in December 2015. It became a top priority in April 2016 and it hit the road for an official closed-course test in September 2016. After FHWA approval, MoDOT began using the TMA Flagger on the roadway by November 2016.

MoDOT plans to put TMA Flaggers on the roadway whenever possible, and has been deployed statewide.

(Explain in 150 words or less.)

## V. RECOGNITION / AWARDS

**1. Has this project previously been nominated for the Governor's Award for Quality and Productivity?**  
If yes, when? no

2. If yes, for which category was it nominated? NA

3. Has this project received any other awards or recognition? If yes, describe. Yes. This innovation competed in MoDOT's Innovation Challenge and won three awards.

--People's Choice Award

--the Director's Award

--First Place in the Tool and Equipment category.

Since then, this innovation has drawn attention from FHWA (Federal Highway Administration), several other DOTs and other industry leaders.

## VI. NOMINATOR'S INFORMATION

Nominating Department: Missouri Department of Transportation

Name: Brittany Goetz

Signature:

Telephone Number: 573-751-2872

E-Mail Address: brittany.goetz@modot.mo.gov

## VII. DEPARTMENT COORDINATOR'S INFORMATION

Name: Brittany Goetz

Signature:

Telephone Number: 573-751-2872

E-Mail Address: Brittany.Goetz@modot.mo.gov

## VIII. DEPARTMENT DIRECTOR APPROVAL

Department Director's Name:

Signature:

Patrick K. McKenna

Nomination must be signed **ONLY** by the Department Director to be eligible for consideration. Nominations not signed by the Department Director will be returned to the agency coordinator.





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## Protective Vehicle/TMA Flagger Operation (Workers on Foot Move with Operation)

### Notes:

STOP/SLOW paddle will be minimum 24 inches and may be LED. The STOP/SLOW paddle shall be a minimum of 6-feet above the pavement.

STOP/SLOW paddle shall be enhanced with an 8-12 inch RED and AMBER lights.

CMS Board will be full matrix capable to provide a lighted STOP sign and provide message to travelers.

The front of trucks may have an arrow or channelizers/arrows to provide direction to on coming traffic.

Continue the use of Light Bar, Emergency Alert Light and Audible Alert systems.

Have alarm system to alert drivers passing when should be stopped. If they continue a vehicle horn will be used to alert workers.

Both vehicles have a radio to communicate with each other.

Camera on the CMS board to see oncoming vehicles.

Since the truck blocks the lane no gate arm is required.

Pilot Car will be used on these operations.

Protective Vehicle/TMA Flagger shall be within 1 mile from the BE PREPARED TO STOP sign.

(1) The Protective Vehicle/TMA Flagger is positioned a minimum of 150-feet upstream of the work area or at the point of vertical or horizontal curves which restrict sight distance.

At night, flagger stations shall be illuminated. Minimum required intensity for flagging operation activity is 0.6 foot-candles.

