RESEARCH PROGRAMS USE ONLY
RESEARCH IDEA NO: 19-006
DATE OF RECEIPT: 4/25/18
TOTAL MDT COST W/ICAP:

RESEARCH PROGRAMS

STAGE 2: RESEARCH TOPIC STATEMENT[1]

Submit completed form to mdtresearch@mt.gov. All fields are required, except the last field: XVIII, Sponsor(s). Incomplete forms will not be accepted.

I. TITLE: Use of Fluorescent Orange Delineators in Temporary Traffic Control Work Zones

II. TOPIC STATEMENT: Road maintenance and reconstruction often present serious safety challenges to highway agencies due to the dynamic and variable work environment which may well be inconsistent with drivers' expectations. As such, proper delineation of travel path through work zones is critical for safe and efficient work zone operations. Currently the Manual on Uniform Traffic Control Devices (MUTCD) only allows white and yellow delineators within temporary traffic control (TTC) work zones (section 6F.80, MUTCD 2009). Field observations suggest that using the conventional white and yellow delineation may not be adequate to effectively delineate traffic through work zones. The proposed research aims to evaluate a new alternative fluorescent orange delineation devices for their effectiveness in guiding traffic through work zones. The Montana Department of Transportation (MDT) used the new proposed devices (larger, 6" x 12", retro reflective fluorescent orange delineators) in lieu of the MUTCD approved white delineators in two rural reconstruction projects during summers 2015 and 2016. Pictures and observations were taken and recorded for the original and proposed delineation devices. MDT project inspectors report the new devices to offer better visibility even when the delineators become dusty and dirty. Traffic control contractors also prefer the larger delineators as they offer an even bigger target value. The fluorescent orange delineators are much more visible during nighttime, adverse weather conditions, and construction activities. Further, road users are familiar with the fluorescent orange color within wok zones which may aid in identifying travelled ways that are not self-explaining. The MUTCD allows the use of devices not described in Chapter 6 of the Manual but this must be based on an engineering study, which is the main impetus for the proposed effectiveness evaluation project. Click or tap here to describe the issue, including any background information.

III. RELATED RESEARCH SUMMARY FROM STAGE 1: The literature search from stage I showed that the proposed fluorescent orange delineators have not been used in practice nor evaluated in any previous study.

IV. RESEARCH PROPOSED: The proposed research project consists of five primary tasks: 1) State-of-the-art review on work zone delineation devices and the different approaches for assessing their effectiveness, 2) Selection of study sites to include a limited number of work zones with different work activity and site conditions, 3) Data collection: traffic surveillance cameras and traffic recorders (on mobile trailers) will be used to collect data from study sites using the regular and the proposed delineation devices, 4) Data processing and compilation which involves extraction of information from video records and traffic sensors in a format appropriate for analysis, 5) Data analysis where major study variables (e.g. lateral clearance between vehicle and delineation devices, roadside encroachments, speeds, etc.) will be analyzed to examine the effectiveness of the proposed delineation devices, and 6) Final report to include a description of the investigations performed along with a summary of major findings and recommendations.

[1] Note: All research topics submitted become public property and submitters are not guaranteed to receive a contract for any work that may result from this topic statement.

V. RESEARCH PERIOD (Time to complete research project.): Total project duration is 24 months including one month period for the MDT panel to review the final project report. The project duration reflects the fact that field experiments will have to take place in summer 2019 construction season.

VI. IT COMPONENT: Identify if the project includes an IT component (purchasing of IT hardware, development of databases, acquisition of existing applications, etc.). If so, describe IT component in as much detail as possible.
Not Applicable

VII. FEASIBILITY, PROBABILITY OF SUCCESS, AND RISK: Safe traffic operations through work zone is a top priority for most highway agencies and contributes to Vision Zero initiative. The proposed research will test a very promising work zone delineation device expected to better guide traffic through work zones, thus contributing to safer driving environment at temporary traffic control areas. The research team has the expertise in conducting similar observational studies where safety effectiveness was assessed using surrogate measures. In this research, chances for success are relatively high with minimal foreseen risks.

VIII. URGENCY, IMPORTANCE, AND EXPECTED BENEFITS/PAY-OFF: Address urgency, timeliness, and importance of the research. Identify if the research is required for any federal or state initiative or compliance. This section must include a description of how this research will help to meet MDT's mission (i.e., serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and/or sensitivity to the environment).
The MDT Work Zone Safety and Mobility Goals and Objectives report published in 2015 outlines Goal 1 as "reduce the number and severity of crashes, injuries and fatalities in construction zones." Effective channelizing devices including delineators are critical in guiding traffic safely through work zones, thus contributing to this important goal. The proposed study is required by MUTCD before application of the new delineation devices is allowed at maintenance and construction sites. Further, the proposed research is expected to have a very high pay-off for MDT given the extensive highway network and associated maintenance and reconstruction operations in the state.

IX. IMPLEMENTABILITY, IMPLEMENTATION PLAN, AND RESPONSIBILITY: Address the implementability of the expected results from the proposed project. Identify products that will enhance implementation. Identify any known implementation barriers and how these barriers might be eliminated or reduced. Identify MDT office or entity outside of MDT responsible for implementation. Describe initial implementation plan, include timeframe for implementation.
The engineering study proposed in this research will facilitate the use of the new work zone delineation devices which could much improve the mobility and safety at highway maintenance and reconstruction sites. The MDT construction program will be responsible for the implementation of study findings.

X. **MDT PRIORITY FOCUS AREAS: MDT may, as often as annually, identify priority research focus areas. These focus areas will be listed on** http://www.mdt.mt.gov/research/unique/solicit.shtml**.** No priority areas are listed by MDT at this time.

XI. TOTAL COST ESTIMATE (If the project proposal comes in at a higher cost, it may require further approval and may be delayed.): $180,000

XII. MDT FUNDING SOURCE (If MDT Research, enter SPR): SPR

XIII. FUNDING MATCH SOURCE AND AMOUNT: Small Urban, Rural and Tribal Center on Mobility (SURTCOM) - $90,000 – 50% matching fund

XIV. FUNDING PARTNER(S): Small Urban, Rural and Tribal Center on Mobility (SURTCOM) – UTC - USDOT

XV. POTENTIAL TECHNICAL PANEL MEMBERS (At this time, individuals do not necessarily need to be identified; rather, MDT offices and outside entities can be named. However, if known, individuals may be named): Click or tap here to enter potential technical panel members.

XVI. SUBMITTED BY:

NAME: Ahmed Al-Kaisy
TITLE: Professor
AFFILIATION: Montana State University

ADDRESS: Civil Engineering, 213 Cobleigh Hall
PHONE NO.: 406-994-6116
E-MAIL: alkaisy@montana.edu

XVII. CHAMPION: Must be internal to MDT, feel strongly that the research will benefit the Department, and is willing to chair the technical panel. Note: If a champion is not identified by you or Research staff, this topic statement will not move forward.

NAME: Jim Wingerter
TITLE: Construction Traffic Control Engineer
AFFILIATION: MDT
ADDRESS: Great Falls, Montana
PHONE NO.: (406) 454-5897
E-MAIL: jwingerter@mt.gov

XVIII. SPONSOR(S) (optional): Must be internal to MDT (Division Administrator or higher) and willing to ensure implementation occurs, as appropriate. If a sponsor is not identified, this topic statement will not move forward.

NAME: Click or tap here to enter sponsor name.
TITLE: Click or tap here to enter sponsor title.
AFFILIATION: Click or tap here to enter sponsor affiliation.
ADDRESS: Click or tap here to enter sponsor address.
PHONE NO.: Click or tap here to enter sponsor phone number.
E-MAIL: Click or tap here to enter sponsor e-mail.