

Experimental Traffic Control Device Testing at Maryland Toll Plazas

Problem

In 2005, the Federal Highway Administration (FHWA) approved MUTCD Experiment Number 3-181(Ex) to test the use of purple pavement marking “dots” as a traffic control device to improve guidance of *E-ZPass*® transponder holders into the dedicated transponder lanes at the Fort McHenry Tunnel toll plaza in I-95 in Maryland. The “dots” were also intended to reduce the incidence of sudden lane changes and/or stopped cash paying toll customers within the dedicated transponder lanes.

An evaluation by the Maryland Transportation Authority (MDTA) found that the experimental purple dot markings provided operational benefits at the Fort McHenry Tunnel toll plaza. The reduction in lane changes with the dots in place indicated a strong potential for safety benefits and there was a high level of customer satisfaction.

In 2008, FHWA advised the MDTA that continuation of the experiment would require enhanced crash data collection and that the experiment would need to be expanded to include additional geographically dispersed test sites to justify consideration of these markings for inclusion in the Manual on Uniform Traffic Control Devices (MUTCD).

Objective

The objective of this project is to conduct a follow up study in Maryland for the purpose of collecting enhanced toll plaza crash (type and location) data with and without the purple “dot” markings. Other toll agencies would also be notified of FHWA’s desire for experimentation and collection of test data at geographically dispersed test sites. The collected data from this initiative would then be submitted to FHWA to support a request to incorporate the purple dots into the MUTCD as a new traffic control device.

Description

Six operational measures of effectiveness (MOEs) are identified in this report (consistent with the 2007 Phase I report) and are evaluated to determine if the purple dots improve wayfinding for *E-ZPass*® customers. Additionally, the report includes a review of crash data at the toll plaza.

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For the six operational MOEs, data are analyzed for an after period (August/September 2011) and compared to before data collected prior to the Phase II installation of the purple dots. Data was aggregated by time of day and week, resulting in a number of before/after comparisons for each MOE.

A statistical analysis test, called the “test of proportions”, is used to evaluate each MOE and determine if changes in results are statistically significant. Safety was assessed using a small sample of enhanced crash data collected during the Phase II experiment and more complete historical crash data from the years of the Phase I experiment.

Results

The results of this experiment indicate that the purple dots reduced lane changing by *E-ZPass*[®] customers. *E-ZPass*[®] customers constitute the greatest percentage of toll plaza users (approximately 70% and growing) and are the group of drivers which the purple dots are intended to assist. Additionally, the purple dots appear to improve safety by reducing crashes on the approach to the toll plaza.

The results of some operational MOEs were mixed. Toll violation rates increased in some lanes and decreased in others, both at statistically significant levels. Likewise, the difference between approach lane volumes and toll lane volumes was desirable in about half the cases and undesirable in about half the cases, all at statistically significant levels. Lane changes by cash customers from Lanes 6 and 7 (dedicated *E-ZPass*[®] lanes) to Lanes 5 and 8 (mixed cash/ *E-ZPass*[®] toll collection lanes) increased.

The purple dots are applicable for center and right-hand side dedicated *E-ZPass*[®] ONLY lanes. These lanes provide for site conditions such as vehicle size restrictions and proximate entry/exit ramps but are difficult for drivers to locate because of site-specific elements such as horizontal or vertical curvature.

Given the measurable safety benefits noted in this report and that motorist response has been positive, MDTA is requesting approval from FHWA to keep the dots in place.

Report Information

Ms. Roxane Y. Mukai
Traffic Manager
Maryland Transportation Authority
rmukai@mdta.state.md.us