

Work Zone Accident Reduction Deployment (WZARD) System Evaluation Results

The Work Zone Accident Reduction Deployment (WZARD) System was deployed by the Minnesota Department of Transportation (MnDOT) in January 2012 along eastbound I-94 between TH 15 in St. Cloud to TH 101 in Rogers. The system identifies when a snow plow or maintenance vehicle is approaching a sign, and then triggers the sign to display a message telling motorists following the snow plow or maintenance vehicle to use caution. The WZARD evaluation project team tested the following hypotheses using available data resources and system user interviews:

- Hypothesis 1 – The WZARD system activated signs when intended and was used during non-winter months.
- Hypothesis 2 – MnDOT snow plow operators and/or maintenance personnel perceived a greater sense of safety when the WZARD system was activated.
- Hypothesis 3 – The WZARD system provided measurable safety benefits.

Hypothesis 1 Test Results

The quantitative data analysis does not provide confidence that the system activated when intended. There was not a strong correlation found with the sign activation logs and either weather data or snow and ice event log data. However, it should be noted that the data was entered manually and could be inaccurate. In addition, it is possible that the signs were posting higher priority messages when they would otherwise be posting a WZARD message. *It is possible that the WZARD System functioned as intended when all key elements (i.e. system turned on, AVL equipped, no higher priority message posted, etc.) were in place. In addition, it was proven that the system was used during non-winter months.*

Hypothesis 2 Test Results

No system users indicated that they perceived a direct change in driver behavior. *However, those users who were the most familiar with the system indicated that they felt that the presence of the signs and ability to post messages (WZARD or non-WZARD) provided some sense of increased safety.*

Hypothesis 3 Test Results

Several tests were conducted to consider the safety benefits of the system. Crash and speed data was considered to identify the following key trends:

- Eastbound and westbound I-94 exhibited decreased crash rates after the WZARD System was deployed.
- The eastbound direction exhibited greater reductions than the westbound direction when considering the annual rates and winter months (but not statistically significant).
- Westbound I-94 was found to have a slightly greater reduction in crash rate when considering snow days only which could be because of the sample size.
- There was a 9% reduction in average daily speed after the deployment of the WZARD System.

It is possible that a crash rate and speed reduction could be attributed to the WZARD System deployment. However, due to data limitations and small sample size, it is difficult to show that the WZARD System offered measurable safety benefits.