The Influence of Creative Advertisements in Bus Rear End Safety Campaign

Boya Dai, Associate Transportation Researcher, Texas A&M Transportation Institute (b-dai@tti.tamu.edu)
Joan Hudson, Research Engineer, Texas A&M Transportation Institute (j-hudson@tti.tamu.edu)
Eun Sug Park, Senior Research Scientist, Texas A&M Transportation Institute (e-park@tti.tamu.edu)
Chris Simek, Associate Research Scientist, Texas A&M Transportation Institute (c-simek@tti.tamu.edu)

Research Sponsored by: Capital Metro

Research Conducted by: Texas A&M Transportation Institute, The Texas A&M University System

Background

A "rear-ended" collision occurs when an agency's transit vehicle is impacted on the rear-end by the front of another vehicle. Such collisions constitute a large proportion of bus crashes. While the literature identifies transit organizations that have engaged in using rear end safety advertisement as a collision countermeasure, quantitative studies on the effectiveness of such countermeasure are lacking. The purpose of this study is to contribute to the existing body of research by evaluating the effectiveness of the creative advertisement used in a rear-end safety ad campaign by Capital Metro (Austin, Texas) to address fixed route buses being rear-ended by other vehicles.

Data & Method

Capital Metro conducted two rear-ended safety campaigns with creative ads over fiscal years 2016 and 2017. Three data sets were used in the evaluation:

- campaign information
- bus collision data (10/2008 – 5/2018)
- bus mileage data (4/2015 – 5/2018)

The effect of creative ads on rear-ended collisions during the two campaigns were assessed separately and together (combined) by a before-after analysis with a comparison group. Crash data were divided into four subsets. Each represents a unique combination of rear-ended crashes or non-rear-ended crashes involving campaign buses or non-campaign buses.

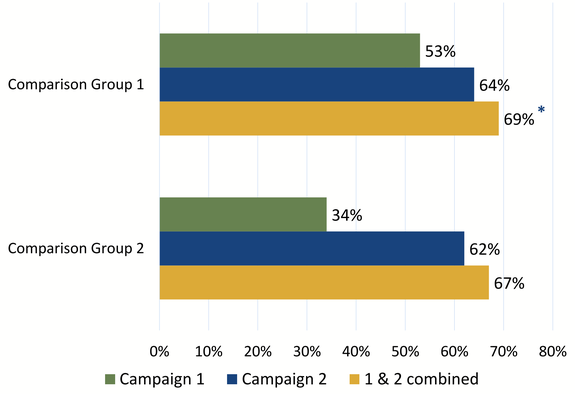
Table 1. Summary of bus crash data used in the before-after analysis with a comparison group

Campaign	Analysis	Treatment/ Comparison Group	Crash (# of buses)	Total before crashes (# of months)	Total after crashes (# of months)	Total before mileage	Total after mileage
1	Analysis with Comparison Group 1	Treatment	Campaign bus rear-ended crashes (59)	49 (60)	4 (5)	NA	NA
		Comparison	Campaign bus non-rear-ended crashes (59)	603 (60)	104 (5)	NA	NA
	Sensitivity Analysis with Comparison Group 2	Treatment	Campaign bus rear-ended crashes (59)	14 (16)	4 (5)	6,209,357	1,240,076
		Comparison	Non-campaign bus rear-ended crashes (276)	45 (16)	21 (5)	20,754,946	4,495,177
2	Analysis with Comparison Group 1	Treatment	Campaign bus rear-ended crashes (52)	39 (63)	2 (5)	NA	NA
		Comparison	Campaign bus non-rear-ended crashes (52)	580 (63)	83 (5)	NA	NA
	Sensitivity Analysis with Comparison Group 2	Treatment	Campaign bus rear-ended crashes (51)	15 (19)	1 (5)	6,164,380	1,047,436
		Comparison	Non-campaign bus rear-ended crashes (236)	43 (19)	9 (5)	20,230,394	4,048,350
1 & 2 combined	Analysis with Comparison Group 1	Treatment	Campaign bus rear-ended crashes (49)	37 (60)	4 (10)	NA	NA
		Comparison	Campaign bus non-rear-ended crashes (49)	495 (60)	170 (10)	NA	NA
	Sensitivity Analysis with Comparison Group 2	Treatment	Campaign bus rear-ended crashes (48)	14 (16)	3 (10)	5,036,948	1,967,927
		Comparison	Non-campaign bus rear-ended crashes (234)	38 (16)	29 (10)	17,592,641	8,137,733

Results

There were reductions in rear-ended crashes following the campaigns. Even though the crash reduction for each of Campaign 1 and Campaign 2 was not statistically significant due to the limited time during the after period (only 5 months for each), the reduction was statistically significant for the combined rear end safety campaigns (incorporating the after period data from both Campaign 1 and Campaign 2) with Comparison Group 1 using the 60 months of before data. Crash reduction estimates from the analysis with Comparison Group 2 were not statistically significant probably due to a much shorter before period (only 16 months) compared to the analysis with Comparison Group 1 (60 months).

Figure 1. Percent crash reduction for rear end safety campaigns



* statistically significant at the 95% confidence interval

Conclusions

Capital Metro effectively used the creative ads in the rear-end safety campaigns that resulted in a reduction of rear-ended crashes. This reduction was seen across all comparisons. But due to the small window of time and limited sample size, most of the reductions for each campaign separately were not statistically significant. However, when the data from the two campaigns were combined and the before-after comparison was performed between crashes (rear-ended and non-rear-ended) involving campaign buses, Capital Metro's rear-end ad campaigns resulted in a 69 percent decrease in rear-ended collisions (statistically significant at the 95% confidence interval).

This study is an initial exploration for quantifying the effectiveness of creative safety ads in reducing rear-end crashes. This finding is important for Capital Metro and others in the transportation industry when considering countermeasures to address rear end safety.