Understanding how drivers perceive anti-tailgating messages can enhance work zone safety.

RESEARCH SOLUTIONS

Enhancing work zone safety with messaging strategies to reduce tailgating

Encouraging safe driving in work zones can be complex due to various and changing conditions created by road construction and maintenance. Tailgating is one of the main causes of rear-end collisions in work zone crashes. In a novel exploration of tailgating in work zones, researchers identified messaging strategies that encourage drivers to allow sufficient space between vehicles. Iowa DOT and other state transportation agencies now have a greater understanding of signage that may reduce work zone tailgating and the potential for crashes.

THE NEED

Road construction projects can slow traffic flow and alter standard driving conditions. Narrower lanes, repositioned lane alignments, changing speed limits and driver speeds, and the presence of machinery and workers can present unexpected obstacles requiring quick driver reactions. Maintaining sufficient gaps between cars is imperative to accommodate these conditions. Tailgating, however, is one of the most common causes of construction zone crashes.

Iowa DOT led a pooled fund effort with seven other state DOTs to study tailgating behaviors and identify targeted messaging strategies that mitigate tailgating and enhance safety in work zones.

RESEARCH APPROACH

An exploration involving messaging design, psychology, and road safety began with a review of existing practices and methods to limit tailgating and improve driver comprehension of the risks. Previous research examined anti-tailgating practices, including pavement markings, signage, in-vehicle warnings, and collaborative measures, in driving simulations but lacked study in actual work zones.

Traffic safety engineers and other professionals collaborated with researchers to devise anti-tailgating messages and sign graphics that elicited positive driver response. Some signs had positively framed

(continued)

"Safe driving in work zones is a function of human behavior, which can be hard to change. The results of this study, however, show that we may discourage tailgating by displaying certain types of messages."

— **DAN SPRENGELER,**
Iowa DOT Work Zone Traffic Control Engineer

messages highlighting the benefits of safe behavior, such as PREVENT CRASHES and KEEP YOUR DISTANCE. Others used language that focused on the negative consequences of unsafe behavior and numerical recommendations for a safe following distance, including NO TAILGATING and STAY 200 FEET APART.

A three-stage survey of potential users from two Iowa Department of Motor Vehicles offices evaluated the signs for comprehensibility and the emotional reaction they invoked. Participants rated eight sign designs and 12 messages using a five-point scale that ranged from excellent to unacceptable. Then respondents chose one reaction: clever or honest (tallied as positive), or confusing, boring, or untrue (tallied as negative). Next, participants reacted to the messages through multiple choice questions. Finally, they responded to open-ended questions to provide a deeper understanding of their interpretations.

Based on the survey results, researchers chose messages for field testing that were placed on fixed signs and dynamic message signs (DMSs). Five anti-tailgating messages, which were rotated daily, were displayed during peak hours at two construction sites: a single-lane closure and a shoulder closure. The sensors recorded traffic volumes, speed, and headway (the time gap between two vehicles).

WHAT IOWA LEARNED

Fixed signs or DMSs with anti-tailgating messages, or a combination of both sign types deployed in work zones resulted in an increase in average headway and a decrease in severe tailgating incidents.

A comparison of survey results about the impacts of positive versus negative messages on tailgating illustrated that positively worded messages invoked affirmative reactions, and participants perceived them as easily understood. Messages with a negative tone or suggesting specific following distances were often perceived as confusing.

Sunlight glare at certain daytime hours impacted the legibility of some DMSs. Researchers recommended carefully considering sign placement to avoid this interference. Similarly, compromised readability of some portable DMSs positioned on one side of the road could be addressed with signs on both roadsides.

PUTTING IT TO WORK

Iowa DOT and the other pooled fund states can use the message strategies immediately in work zones demonstrating known tailgating issues. While these results indicate positively worded anti-tailgating messages can lead to enhanced traffic safety in work zones, additional research could consider the impacts of different messaging on DMS, sign readability, and graphic signs versus text-only signs.

ABOUT THIS PROJECT

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